MC1-MK

Master Control Switcher
Installation Manual

ROSS

Thank you for choosing Ross

You've made a great choice. We expect you will be very happy with your purchase of Ross Technology.

Our mission is to:

1. Provide a Superior Customer Experience
    - offer the best product quality and support
2. Make Cool Practical Technology
    - develop great products that customers love

Ross has become well known for the Ross Video Code of Ethics. It guides our interactions and empowers our employees. I hope you enjoy reading it below.

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at *solutions@rossvideo.com*.

David Ross
CEO, Ross Video
dross@rossvideo.com

Ross Video Code of Ethics

Any company is the sum total of the people that make things happen. At Ross, our employees are a special group. Our employees truly care about doing a great job and delivering a high quality customer experience every day. This code of ethics hangs on the wall of all Ross Video locations to guide our behavior:

1. We will always act in our customers' best interest.
2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.
9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

MC1-MK Installation Manual

- Ross Part Number: MC1MKDR-004A-08
- Release Date: March 23, 2015.

Copyright

© 2015 Ross Video Limited. Ross®, openGear®, and any related marks are trademarks or registered trademarks of Ross Video Ltd. All other trademarks are the property of their respective companies. PATENTS ISSUED and PENDING. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording or otherwise, without the prior written permission of Ross Video. While every precaution has been taken in the preparation of this document, Ross Video assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

Patents

Patent numbers US 7,034,886; US 7,508,455; US 7,602,446; US 7,802,802 B2; US 7,834,886; US 7,914,332; US 8,307,284; US 8,407,374 B2; US 8,499,019 B2; US 8,519,949 B2; US 8,743,292 B2; GB 2,419,119 B; GB 2,447,380 B; and other patents pending.

Important Regulatory and Safety Notices to Service Personnel

Before using this product and any associated equipment, refer to the "**Important Safety Instructions**" listed below to avoid personnel injury and to prevent product damage.

Product may require specific equipment, and/or installation procedures to be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Meanings

This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage to persons or equipment.

Warning — *The symbol with the word "**Warning**" within the equipment manual indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.*

Caution — *The symbol with the word "**Caution**" within the equipment manual indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.*

Notice — *The symbol with the word "**Notice**" within the equipment manual indicates a potentially hazardous situation, which, if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.*

ESD Susceptibility — *This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.*

Important Safety Instructions

Caution — *This product is intended to be a component product of the DFR-8300 and OG3-FR series frames. Refer to the DFR-8300 and OG3-FR Series Frame User Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.*

Warning — *Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing this area.*

Warning — *Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.*
This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained with the product's power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair. To reduce the risk of fire, replacement fuses must be the same time and rating. Only use attachments/accessories specified by the manufacturer.

Warning — *This product includes an "Ethernet Port" which allows this product to be connected to a local area network (LAN). Only connect to networks that remain inside the building. Do not connect to networks that go outside the building.*

EMC Notices

United States of America
FCC Part 15

This equipment has been tested and found to comply with the limits for a class A Digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Notice — *Changes or modifications to this equipment not expressly approved by Ross Video Limited could void the user's authority to operate this equipment.*

CANADA

This Class "A" digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe "A" est conforme a la norme NMB-003 du Canada.

EUROPE

This equipment is in compliance with the essential requirements and other relevant provisions of CE Directive 93/68/EEC.

INTERNATIONAL

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002**, and found to comply with the limits for a Class A Digital device.

Notice — *This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.*

Maintenance/User Serviceable Parts

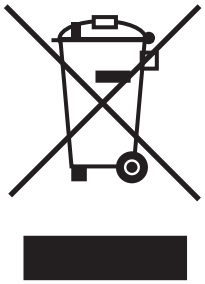
Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the "Contact Us" section on the last page of this manual. All openGear products are covered by a generous 5-year warranty and will be repaired without charge for materials or labor within this period. See the "Warranty and Repair Policy" section in this manual for details.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed out wheelie bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performance of our products.

Company Address

Ross Video Limited
8 John Street
Iroquois, Ontario, K0E 1K0
Canada

Ross Video Incorporated
P.O. Box 880
Ogdensburg, New York
USA 13669-0880

General Business Office: (+1) 613 • 652 • 4886
Fax: (+1) 613 • 652 • 4425
Technical Support: (+1) 613 • 652 • 4886
After Hours Emergency: (+1) 613 • 349 • 0006
E-mail (Technical Support): techsupport@rossvideo.com
E-mail (General Information): solutions@rossvideo.com
Website: http://www.rossvideo.com

Contents

Introduction 1

In This Chapter 1-1
A Word of Thanks 1-1
Product Summary 1-2
Functional Overview 1-3
System Integration 1-4
Interfaces 1-5
DashBoard Control System 1-5
MC1-PANEL-16 1-5
SNMP Monitoring 1-5
Serial Protocols 1-5
Documentation Terms and Conventions 1-7
Terms 1-7
Conventions 1-7

Physical Installation 2

In This Chapter 2-1
Before You Begin 2-2
Related Publications 2-2
Card Overview 2-3
Card-edge LEDs 2-4
Getting Started 2-5
Installing the openGear Frame 2-5
Installing the MC1-MK Card 2-5
Power Fail Relay 2-5
To install a rear module in an openGear frame 2-5
To install a card in the openGear frame 2-6
Installing the MC1-PANEL-16 2-6
Installing the Rack Mount PC 2-6
Installing the Touchscreen Display 2-6
Using DashBoard to Access the MC1-MK 2-6
To launch DashBoard 2-6
To access the MC1-MK Configuration Interface 2-7
Cabling Overview 2-8
8320AR-033 Cabling 2-8
8320AR-055 Cabling 2-8
Video Connections 2-9
Input Cabling 2-9
Input Mapping 2-9
Output Cabling 2-10
Output Mapping 2-10
Reference Cabling 2-11
Ethernet Communications 2-12
Ethernet Cabling for the MC1-MK 2-12
To set up ethernet communications for the MC1-MK 2-12
GPIO/Tally Setup 2-14
GPI/Tally Cabling 2-14

8320AR-033 Cabling 2-14
8320AR-055 Cabling 2-14
To set up GPI/Tally communications for the MC1-MK 2-15
Linear Timecode Setup 2-16
Serial Setup 2-16
Cabling for the Serial COM port 2-16
To configure serial communications for an LTC input 2-16
GPI Setup 2-17
Cabling for a GPI Port 2-17
To configure GPI communications for an LTC input 2-17
Device Control 2-19

Router Setup 3

In This Chapter 3-1
Cabling 3-2
Connections for the Primary NK-IPS 3-2
Connections for a Secondary NK-IPS 3-3
Communications Setup 3-4
To establish communications between a router and the MC1-MK 3-4
To specify the communications protocol for MC1-MK 3-4
Source Mapping 3-6
Output Mapping 3-6
To map router output sources to MC1-MK inputs 3-6
Crosspoint Mapping 3-7
Mapping the RTR Extra Buttons 3-7
To map a crosspoint button in MC1-MK 3-8

MC1-MK Configuration 4

In This Chapter 4-1
Selecting the Sources 4-2
To select the video format and reference source 4-2
To configure your video outputs 4-3
To set up the signal loss alarm feature 4-3
SqueezeBack Setup 4-4
Specifying the Key Order 4-4
To specify the key order of the SqueezeBacks 4-4
Configuring a Tally for a SqueezeBack 4-5
To configure a tally for SqueezeBack 4-5
Configuring GPI Control of SqueezeBacks 4-5
To configure a GPI for SqueezeBacks 4-5
Additional Configuration 4-6
Configuring the Edit Permissions 4-6
To configure the card edit permissions 4-6
Configuring the Input Signal Timing Display 4-6
To configure the input signal timing for your card 4-6
Loading the Factory Defaults 4-7
To reset the card to the factory default settings in DashBoard 4-7
Auto Swapping of Program and Preset Buses 4-7
To swap the buses after a transition 4-7
To configure the Preset Keyers option 4-8
Disabling the Fade to Black Button 4-8
To disable the FTB button 4-8
Automation Switch Requests 4-9
To define the automation switch requests 4-9
To define the TAKE button behavior for automation 4-9

Specifying the Number of Available Crosspoints 4-9
To specify the number of available crosspoints 4-9
Using Multiple MC1-MK Cards 4-11
Updating the Icons 4-11
Overview of the Graphic Files 4-11
Managing the Graphic Files 4-11
Configuring the Channel Select Buttons 4-11
To specify the number of Channel Select buttons 4-12
To configure the first MC1-MK 4-12
To set up additional MC1-MK 4-13
Notes on Using Multiple MC1-MK Cards 4-13
Using the Presmaster Protocol for VGPIs 4-14
Assigning a VGPI to a SqueezeBack Preset 4-14
To assign a SqueezeBack Preset to an VGPI 4-14
Software Upgrades 4-15
To upgrade the software on a card 4-15

Audio Configuration 5

In This Chapter 5-1
Audio Overview 5-2
Workflow 5-2
Audio Processing 5-2
Audio Shuffling 5-2
Voice Over and EAS 5-2
Audio Profiles 5-3
Specifying Embedded Audio Groups 5-4
To specify which audio groups to embed 5-4
Audio Shuffling 5-5
To map the audio channels 5-5
Audio Processing 5-7
To configure the audio proc amps 5-7
Voice Over Setup 5-8
To set up the voice over source 5-8
Setting up the Audio for EAS 5-9
Configuring the Audio Source for EAS 5-9
To set up an EAS source 5-9
Setting the EAS Duck and Gain Levels 5-10
To set the EAS duck level 5-10
Resetting the Audio Gain Level During Transitions 5-11
To reset the audio gain level after a transition 5-11
Creating an Audio Profile 5-12
To create an audio profile 5-12

Configuring the Text Overlay 6

In This Chapter 6-1
Customizing the EAS Text Overlay 6-2
To customize the EAS text overlay 6-2

Stand-alone MC1-MK 7

In This Chapter 7-1
Overview 7-2
Stand-alone branding and logo insertion 7-2
Stand-alone Emergency A/B mixing 7-2
Stand-alone EAS insertion 7-2
Stand-alone SqueezeBack 7-2

Stand-alone audio/voice over mixing 7-2
System Integration 7-3
Setup 7-4
Input Cabling 7-4
Communications Setup 7-4
To specify the stand-alone setup for MC1-MK 7-4
Source Mapping 7-5
Output Mapping 7-5
To disable the default router output mapping 7-5
Crosspoint Mapping 7-5
To change the crosspoint map for the MC1-MK 7-5

Appendix A. DashBoard Menus 8

In This Appendix 8-1
Status Tabs 8-2
Signal Tab 8-2
Hardware Tab 8-3
Product Tab 8-4
Video Tab 8-5
Audio Tab 8-7
GPI/Tally Tab 8-8
GPI Configuration 8-8
Tally Configuration 8-9
Remote Control Tab 8-10
Default Values 8-13
Serial Port 8-13
Ethernet Port 8-14
Ethernet Tab 8-15
Video Inputs Tab 8-16
SqueezeBack Tab 8-17
Personality Tab 8-18
Load/Save Tab 8-21
Loading the Factory Defaults 8-21
Router Tab 8-22
Audio Tabs 8-23
Voice Over and EAS Tabs 8-23
Audio Shuffle Tab 8-23
Audio Processing Tab 8-24
Audio Profile Tab 8-24
Presmaster VGPI Tab 8-25
TFT EAS Setup Tab 8-26
Sage EAS Setup Tab 8-28

Appendix B. Specifications 9

In This Appendix 9-1
Technical Specifications 9-2
Communication Specifications 9-3
Serial COM Port 9-3
8320AR-033 Rear Module 9-3
8320AR-055 Rear Module 9-3
LTC Serial Cabling Requirements 9-4
8320AR-033 Rear Module 9-4
8320AR-055 Rear Module 9-4
Ethernet Port 9-4
GPIO Connections 9-5

Tally Connections 9-5
Video Characteristics 9-6
Video Processing 9-6
Output Format Reference Compatibility 9-6

Appendix C. Serial Protocols 10

In This Appendix 10-1
Miranda™ Presmaster Control System Protocol 10-2
Commands 10-2
Automation Switch Request 10-4
Tallies 10-5
Pre-Roll and Take Command 10-6

Appendix D. Software Licenses 11

In This Appendix 11-1
BSD 11-2
Dual GPL/Free Type 11-3
GPL 11-4
IJG 11-8
LGPL 11-9
MIT 11-11
zlib 11-12

Appendix E. Service Information 12

In This Appendix 12-1
Troubleshooting Checklist 12-2
Software Upgrades 12-2
Warranty and Repair Policy 12-3
In Case of Problems 12-3

Index IX

Introduction

In This Chapter

This chapter contains the following sections:

- Product Summary
- Functional Overview
- System Integration
- Interfaces
- Documentation Terms and Conventions

A Word of Thanks

Congratulations on your purchase of the Ross Video MC1-MK Master Control Switcher. The MC1-MK is part of a full line of Ross Video products which are backed by over 25 years of engineering and design expertise. You will be pleased at how easily your new card fits into your overall working environment. Equally pleasing is the product quality, reliability, and functionality.

Should you have a question pertaining to the installation or operation of your MC1-MK, please contact us at the numbers listed in the section "**Contact Us**" located at the back of this manual. Our technical support staff is always available for consultation, training, or service.

Product Summary

The MC1-MK includes the following features:

- Compliance with SDI SMPTE 292M (1.485Gbps), and SMPTE 259M (270Mbps)
- Four[1] separate stills/animations in use at any time (Logos 1 to 4); each logo may also have an optional Alpha channel (Alpha 1 to 4)
- 2GB of DDR playout memory with support for TGA, PNG and JPG formats *(MC1-MK only)*
- 4GB of DDR playout memory with support for TGA, PNG, and JPG formats *(MC1-MK-4GB only)*
- Support of popular formats such as 1080i, and 720p
- Eight bi-directional ports that are user programmable to be a GPI or a Tally
- Support for VGPIs when using the Miranda™ Presmaster Automation Protocol
- Four SDI inputs that include two background inputs (A, B), External Key Video, and External Key Alpha
- Four SDI outputs that may be configured as Program, Preview, or Clean Feeds
- Bypass relay from BKGD A (BNC 3) to Output 1 (BNC 5) protects your on-air feed when the device is taken off-line and ensures critical program content is not lost
- Ethernet 10/100Mbit connectivity for easy upgrades in the field and for transferring files
- Reports status and configuration remotely via the DashBoard Control System
- Provides remote serial control of the card using the Miranda™ Presmaster protocols
- Three options for specifying the card reference
- Supports SNMP alarms for the input and reference signals
- Specify how the input signal timing is reported (relative to the reference or the output)
- Provides an overlay engine capable of displaying one layer of text in real time
- V-Fade, Take-Fade, Fade-Take, or Cross fade between video sources
- Stand-alone SqueezeBack
- Stand-alone audio/voice over mixing
- Clean audio switching for embedded audio at 48kHz
- Fade to Black function
- Provides keyer controls such as clip and gain, key invert, and transparency
- Audio processing for 16 embedded audio channels
- Audio shuffling from any embedded input (or mute or tone) for each embedded output
- Configure up to 4 audio profiles that can be recalled on any crosspoint
- Fully compliant with openGear specifications and installs in the openGear frames
- 5 year transferable warranty

1. Or three if EAS is used; in this case one channel is reserved for EAS.

Functional Overview

This section provides a functional block diagram for the MC1-MK card only.

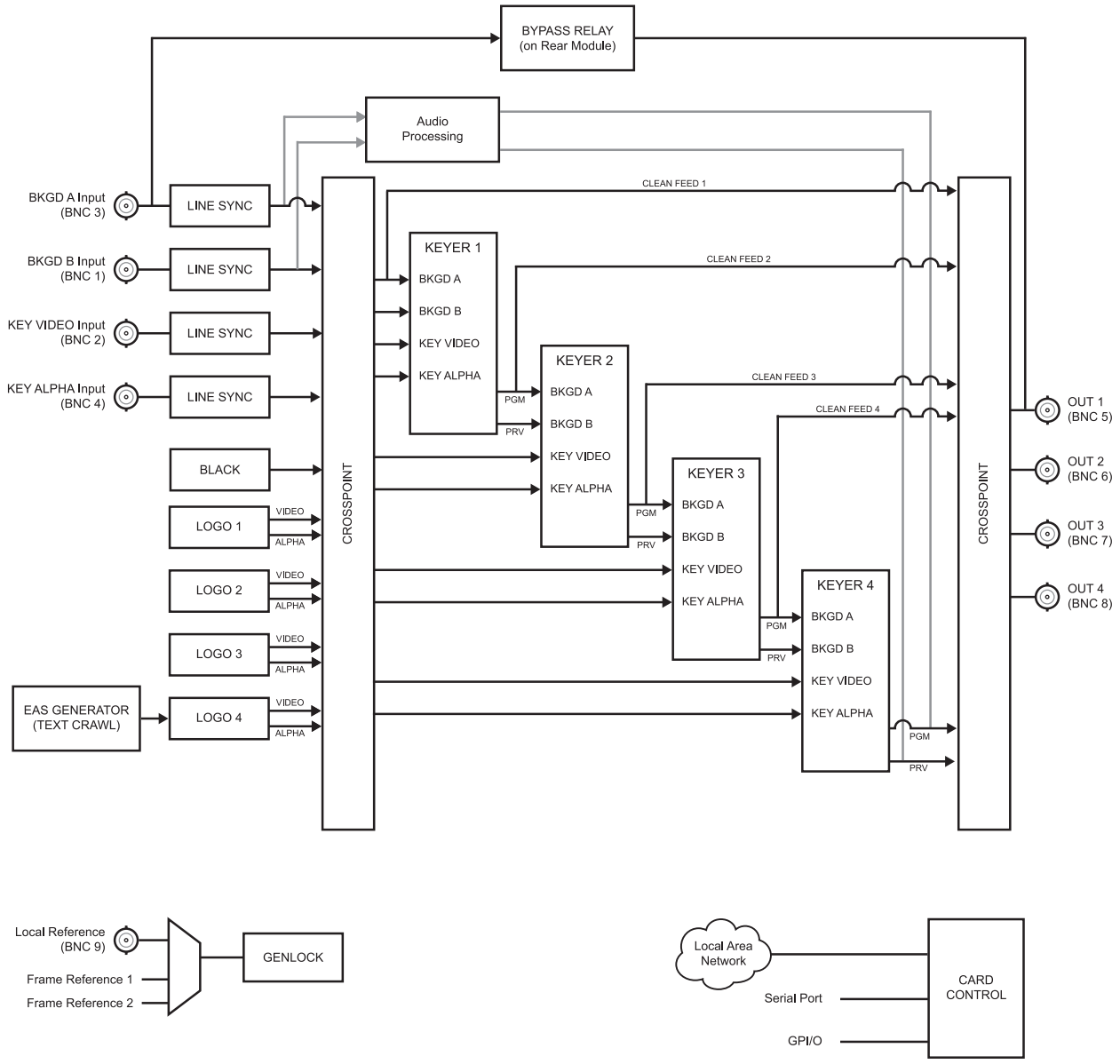


Figure 1.1 *Simplified Block Diagram — MC1-MK Card*

System Integration

This section provides a system diagram that illustrates one way to integrate your MC1-MK into a Master Control System. Please note that this is only an example and your facility needs may differ from what is presented here.

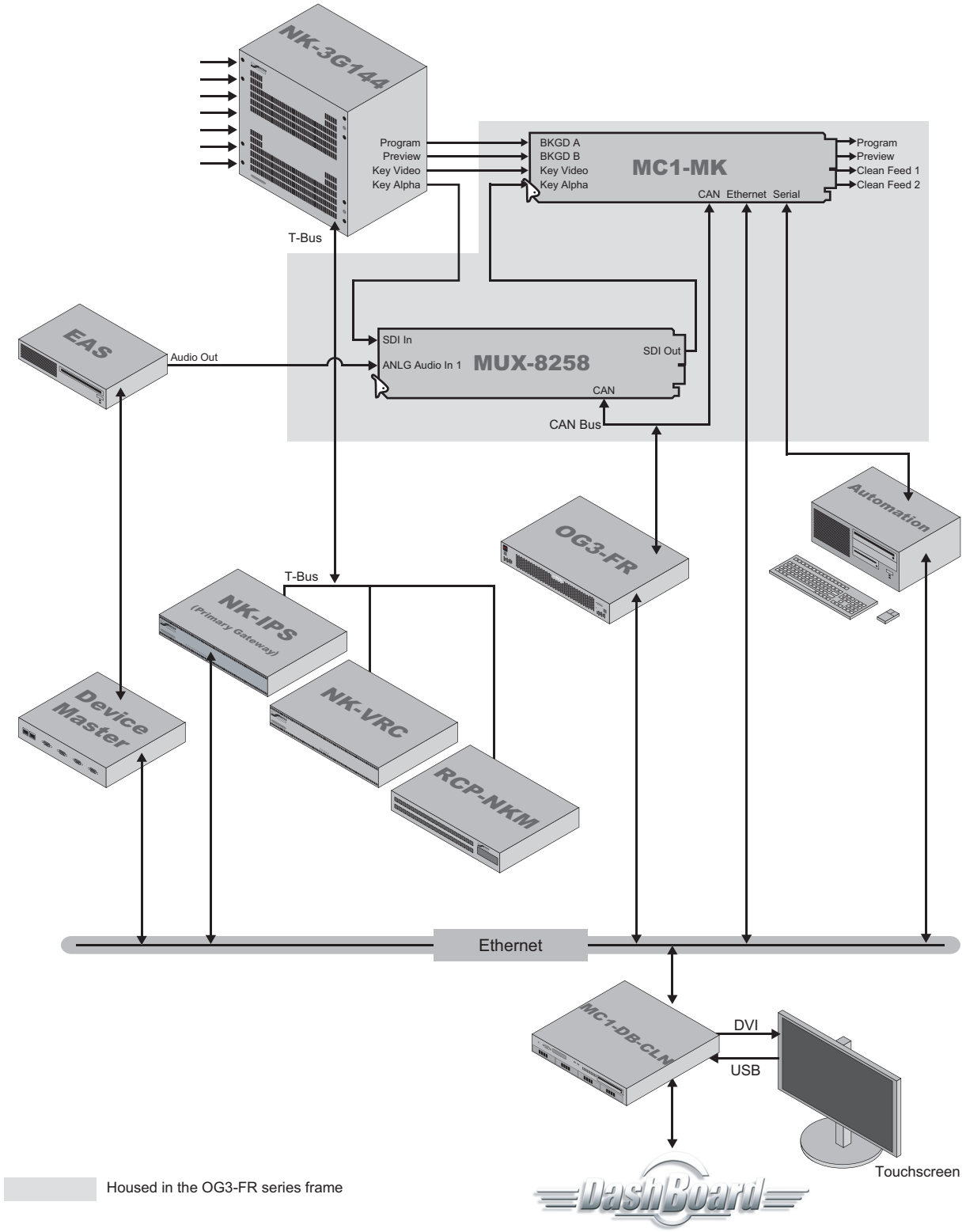


***Figure 1.2** System Integration — MC1-MK*

Interfaces

The MC1-MK is intended to be controlled primarily via an automation system such as the Miranda™ Presmaster. Secondary control is available via the DashBoard Control System client software, as well as through GPI signals. Optional SNMP monitoring is also available.

DashBoard Control System

The DashBoard client software enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with cards in the openGear frames through a Network Controller Card. This controller card is required in order to use DashBoard to control and monitor openGear cards.

The MC1-MK includes two DashBoard interfaces: Configuration and On Air Controls. Both interfaces are accessed by expanding the MC1-MK node in the DashBoard Tree View and selecting the appropriate sub-node. The Configuration interface is intended for setup purposes such as specifying sources, setting up serial and ethernet communications, and bus mapping. The On Air Controls interface includes operational controls such as configuring keyer sources, loading media files to logo channels, and performing transitions.

For More Information on...

- configuring the Network Controller Card, refer to the ***MFC-OG3 Series User Manual***.
- installing and using DashBoard, refer to the ***DashBoard User Manual***.

MC1-PANEL-16

The MC1-PANEL-16 is a stand-alone control panel that provides all the basic user input of the MC1-MK card (channel) it is controlling. Up to 10 channels can be configured independently, allowing a single MC1-PANEL-16 to communicate and control 10 cards.

For More Information on...

- configuring an MC1-PANEL-16, refer to the ***MC1-PANEL-16 User Manual***.

SNMP Monitoring

The Network Controller Card in the openGear frame provides optional support for remote monitoring of your frame using Simple Network Management Protocol (SNMP), which is compatible with many third-party monitoring tools.

For More Information on...

- the available SNMP monitoring features, refer to the Management Information Base (MIB) file that came with your openGear card(s).
- SNMP Monitoring, refer to the ***MFC-OG3 Series User Manual***.

Serial Protocols

The MC1-MK serial interface provides a communication link between a computer based editing or automation system and the MC1-MK.

For More Information on...

- setting up an automation system with the MC1-MK, refer to the MC1-MK setup sheet for your device. This setup sheet is available on the ***MC1-MK Documentation Resources CD*** that accompanied your MC1-MK.

- the Miranda™ Presmaster protocol, refer to the ***Miranda Presmaster Automation Protocol Manual***.

Documentation Terms and Conventions

This section briefly summarizes the terms and conventions used throughout this manual.

Terms

The following terms are used:

- "**Auto Select Key**" is a key in which two video signals are required to insert the key. The Key Alpha is used to cut the hole in the video and Key Video is used to fill the hole.
- "**Board**" or "**Card**" refers to both the MC1-MK and MC1-MK-4GB including all components and switches unless otherwise noted.
- "**DashBoard**" refers to the DashBoard Control System client software.
- "**LTC**" and "**Timecode**" both refer to Linear Timecode unless otherwise noted.
- "**MC1-MK**" refers to all versions of the MC1-MK unless otherwise noted.
- "**MC1-MK-4GB**" refers only to the MC1-MK with 4GB DDR playout memory.
- "**MUX-8258-C**" refers to the MUX-8258-4C and MUX-8258-8C unless otherwise noted.
- "**Network Controller card**" refers to the MFC-OG3-N, MFC-8322-N and the MFC-8321-N unless otherwise noted.
- "**openGear frame**" refers to all versions of the DFR-8321 series and OG3-FR series frames and any available options unless otherwise noted.
- "**Operator**" and "**User**" refers to the person who uses the MC1-MK.
- "**Self Key**" is a key in which the luminance, or brightness, values of the key source is used as the alpha for the key.
- "**SqueezeBack Preset**" refers to one of the four presets available to transition to pre-squeezed effects to reveal another video source or graphic.
- "**System**" and "**Video System**" refers to the mix of interconnected digital and analog production equipment in which the MC1-MK operates.
- "**VGPI**" refers to the Virtual GPI feature of the Miranda™ Presmaster Automation protocol.

Conventions

The following conventions are used:

- The "**Operating Tips**" and "**Note**" boxes are used throughout this manual to provide additional user information.

Physical Installation

In This Chapter

This chapter provides an overview for the basic physical installation of your MC1-MK.

The following topics are discussed:

- Before You Begin
- Card Overview
- Getting Started
- Cabling Overview
- Video Connections
- Ethernet Communications
- GPIO/Tally Setup
- Linear Timecode Setup
- Device Control

Before You Begin

Before you begin, ensure that you are using DashBoard version 6.2.0 or higher.The DashBoard Control System software and user manual are available to download from the Ross Video website.

Static Discharge

Throughout this chapter, please heed the following cautionary note:

ESD Susceptibility — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

Unpacking

Unpack each card you received from the shipping container and ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.

Related Publications

It is recommended to consult the following Ross documentation before installing and configuring your MC1-MK:

- ***DashBoard User Manual***, Ross Part Number: 8351DR-004
- ***OG3-FR Series Frames User Manual***, Ross Part Number 8300DR-005
- ***MC1-MK Operation Manual,*** Ross Part Number: MC1MKDR-004B
- ***MC1-DB-CLN Quick Start Guide,*** Ross Part Number: MC1DBCLNDR-002
- ***MFC-OG3 Series User Manual***, Ross Part Number: 8300DR-004
- ***MUX-8258 (-A, -4C, -8C) User Manual***, Ross Part Number: 8258DR-004

Card Overview

This section provides an overview of the card components.

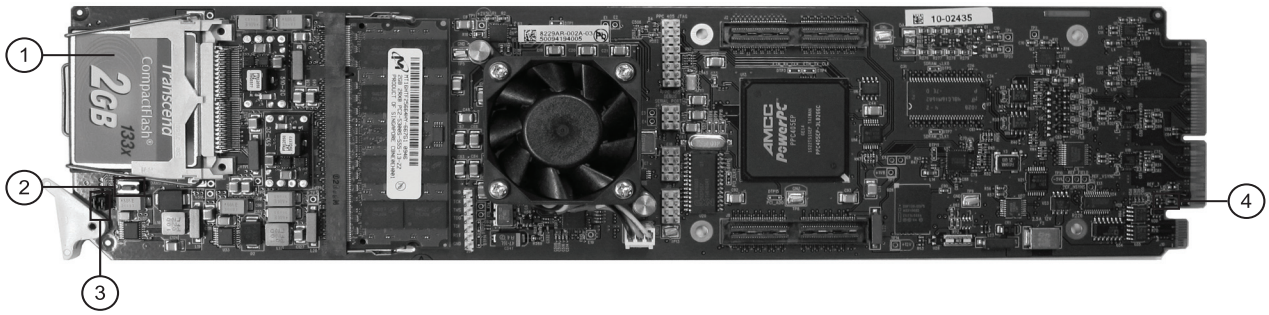


***Figure 2.1** Components*

1) CompactFlash® Card	3) JP5, JP6
2) Board Reset Button (SW1)	4) Reference Termination (JP7)

1. CompactFlash® Card

The CompactFlash card provides 2GB (MC1-MK) or 4GB (MC1-MK-4GB) of flash memory for storage of media files, such as stills and animations.

2. Board Reset Button (SW1)

Pressing this button resets the microprocessor and re-initializes the card. This is a hard reset of the card. This should only be performed as advised by Ross Video Technical Support.

3. JP5, JP6

These jumpers are not yet implemented and must be left in the default position of Pin 2 (center) and Pin 3 (bottom).

4. Reference Termination (JP7)

J7 is a 3-position jumper block used to configure the 75ohm termination on the local analog reference input on **BNC 9** of the Rear Module.

- **Pin 1** (left) + **Pin 2** (center) position — In this position, the analog reference is terminated with an 75ohm resistor. This configuration is to be used for point-to-point cabling, or on the last card of a daisy chain topology. This is the default position (**Figure 2.2**).

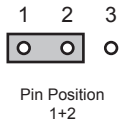


***Figure 2.2** J7 — Default Position*

- **Pin 2** (center) + **Pin 3** (right) position — In this position, the 75ohm terminator is removed and the analog reference is not terminated. This configuration is used in a daisy chain cabling topology where only the last card is to be terminated.

Card-edge LEDs

This section describes the card-edge LEDs that are used to monitor communication. (**Figure 2.3**)

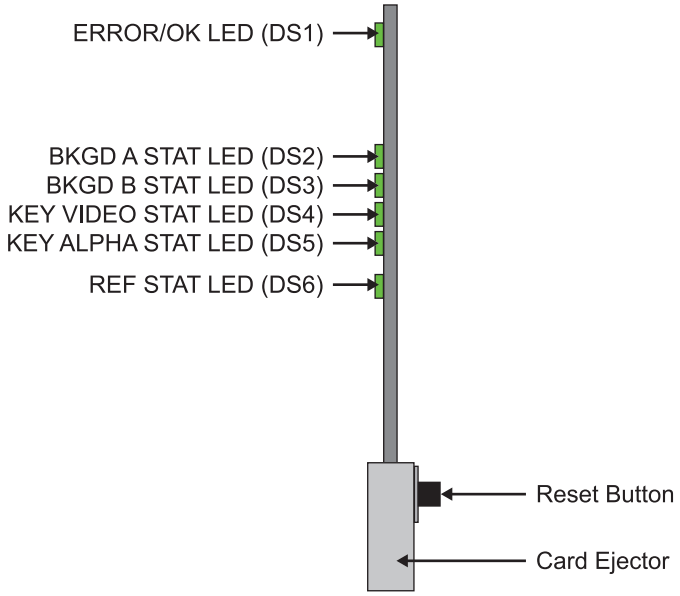


***Figure 2.3** Card-edge Controls*

Table 2.1 LEDs on the Card-edge

LED	Color	Display and Description
ERROR/OK	Green	When this LED is green, the card is in normal operation with no errors.
	Red	When this LED is red, the card is experiencing internal errors.
	Off	When this LED is off, there is no power to the card.
BKGD A STAT	Green	When this LED is green, the BKGD A video input is valid.
	Red	When this LED is red, the BKGD A input is not present or is invalid.
BKGD B STAT	Green	When this LED is green, the BKGD B video input is valid.
	Red	When this LED is red, the BKGD B input is not present or is invalid.
KEY VIDEO STAT	Green	When this LED is green, the external Key Video input is valid.
	Red	When this LED is red, the external Key Video input is not present or is invalid.
KEY ALPHA STAT	Green	When this LED is green, the external Key Alpha video input is valid.
	Red	When this LED is red, the external Key Alpha video input is not present or is invalid.
REF STAT	Green	When this LED is green, the reference signal is valid.
	Red	When this LED is red, the reference signal is not present or is invalid.

Getting Started

The MC1-MK includes a system of openGear cards installed in an openGear frame that communicate via DashBoard to external devices such as routers and Emergency Alert Systems (EAS). This section provides information for setting up the frame, cards, and DashBoard before you can proceed to cabling and communicating with external devices.

Installing the openGear Frame

The openGear frame is a 2RU high density modular frame, designed to accommodate up to 20 openGear cards. The Network Controller card, the MC1-MK, and the MUX-8258 are installed in the frame slots.

When you are facing the openGear frame front, the Network Controller card is located in the furthest slot to the right. This card features an ethernet interface which allows the openGear cards to be monitored and controlled using DashBoard.

For More Information on...

- physically installing your frame, refer to the ***OG3-FR Series User Manual***.
- configuring an openGear card, refer to the associated product user manual.

Installing the MC1-MK Card

This section provides a brief overview of the required Rear Modules and physical installation of the MC1-MK.

Power Fail Relay

There is a power fail relay from the BKGD A input to Output 1 on the Rear Module. The purpose of this relay is as follows:

- When the card is removed from the frame, the relay passes video from the BKGD A input to the OUT 1 of the card. This allows the card to be serviced without interrupting the video signal.
- If the card loses power, or the frame loses power, the video still passes through.
- When the card boots, the relay will be left in Bypass mode until the card can generate a valid output. Once the card is up and functional, the relay is disabled.

To install a rear module in an openGear frame

1. Remove the Blank Plates from the rear of the selected card frame slots.
2. Seat the bottom of the Rear Module in the seating slot at the base of the backplane of the frame.
3. Align the top hole of the Rear Module with the screw hole on the top-edge of the frame backplane.
4. Using a Phillips screwdriver and the supplied screw, fasten the Rear Module to the backplane. Do not over tighten.
5. The Rear Module Label is self-adhesive. Remove the wax sheet before affixing the label.
6. Affix the supplied Rear Module Label to the BNC area of the Rear Module.

7. To ensure proper frame cooling and ventilation, verify that all unused slots are covered with Rear Modules or Blank Plates.

Note — *Verify that the card aligns with the Rear Module before fully tightening any of the slot screws.*

To install a card in the openGear frame

1. Ensure that the openGear frame is properly installed.
2. Ensure the Rear Module is properly installed.
3. Hold the card by the edges and carefully align the card edges with the rails in the frame.
4. Fully insert the card into the frame until the card is properly seated in the Rear Module.

Installing the MC1-PANEL-16

Install and configure your MC1-PANEL-16 as outlined in the ***MC1-PANEL-16 Quick Start Guide*** that came with your panel. Refer to the ***MC1-PANEL-16 User Manual*** for configuration details.

Installing the Rack Mount PC

Install and configure your rack mount PC as outlined in the ***MC1-DB-CLN Quick Start Guide*** that came with your system.

Installing the Touchscreen Display

The interactive touchscreen display provides all of the menu interaction for the MC1-MK, including functions such as configuration, crosspoint selection, and performing transitions. Ensure that the touchscreen is connected to the PC via a USB cable. It is recommended to use a touchscreen with 1680x1050 resolution.

Refer to the documentation that came with your touchscreen for specific installation and setup instructions.

Using DashBoard to Access the MC1-MK

Before proceeding, ensure that the DashBoard client software is installed on a PC connected to your facility network. The DashBoard software and user manual are available from the Ross Video website.

To launch DashBoard

1. Ensure that you are running DashBoard software version 5.1 or higher.
2. Launch DashBoard by double-clicking its icon on your desktop.
3. Ensure that the openGear frame with the MC1-MK is displayed in the Basic Tree View. If not, consult the ***MFC-OG3 Series User Manual*** and ***DashBoard User Manual***.

To access the MC1-MK Configuration Interface

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.

Cabling Overview

When installing the card in the openGear frame, the **8320AR-033** Rear Module or the **8320AR-055** Rear Module is required. This section provides an overview of the cabling designations for each rear module the MC1-MK supports.

8320AR-033 Cabling

This rear module occupies four slots in the frame and accommodates one card.

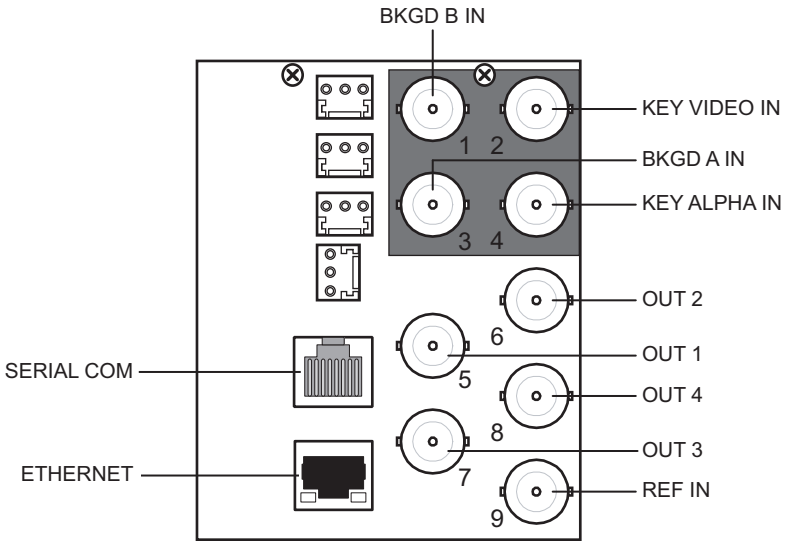


***Figure 2.4** Cabling — 8320AR-033 Rear Module*

8320AR-055 Cabling

This rear module occupies four slots in the frame and accommodates one card.

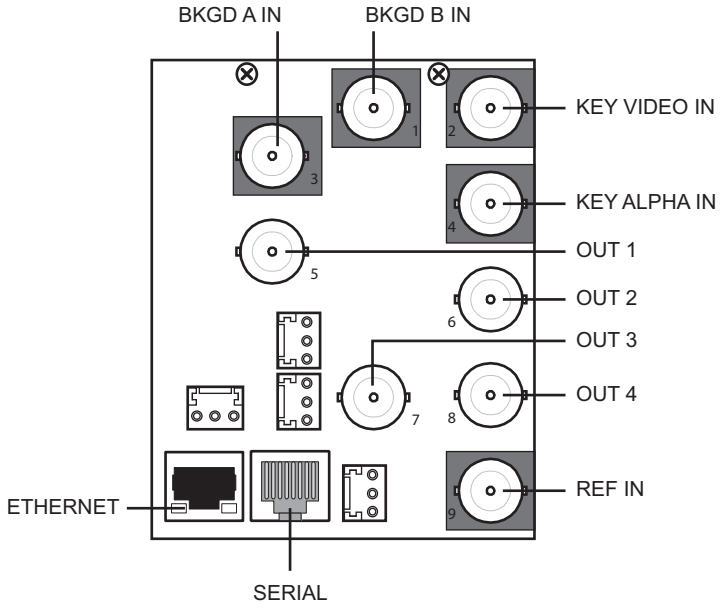


***Figure 2.5** Cabling — 8320AR-055 Rear Module*

Video Connections

Connect your input video signals to the BNCs on the rear module as required. In the following figures, the rear module depicted on the left is for the MC1-MK while the rear module on the right is for the MUX-8258-C. Note that the location of your rear modules in the frame may differ than what is presented here.

Input Cabling

Connect your MC1-MK input video signals as illustrated in **Figure 2.6**. Ross Video does not supply these cables.

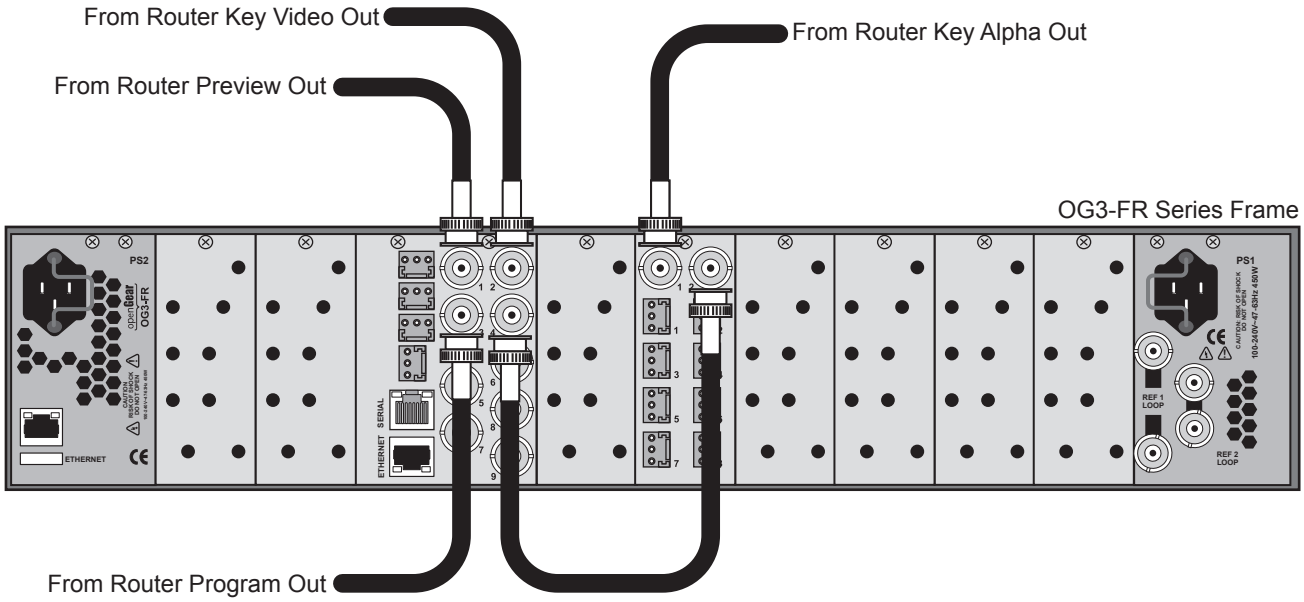


***Figure 2.6** openGear Frame Cabling — Inputs and Outputs*

Input Mapping

The default mapping includes router inputs, but it is first necessary to configure the router outputs and crosspoints. Inputs are mapped as outlined in the section "**Source Mapping**" on page 3-6.

For More Information on...

- interpreting the type of router crosspoints, refer to the section "**To establish communications between a router and the MC1-MK**" on page 3-4.

Output Cabling

Connect your output video signals as illustrated in **Figure 2.7**. Ross Video does not supply these cables.

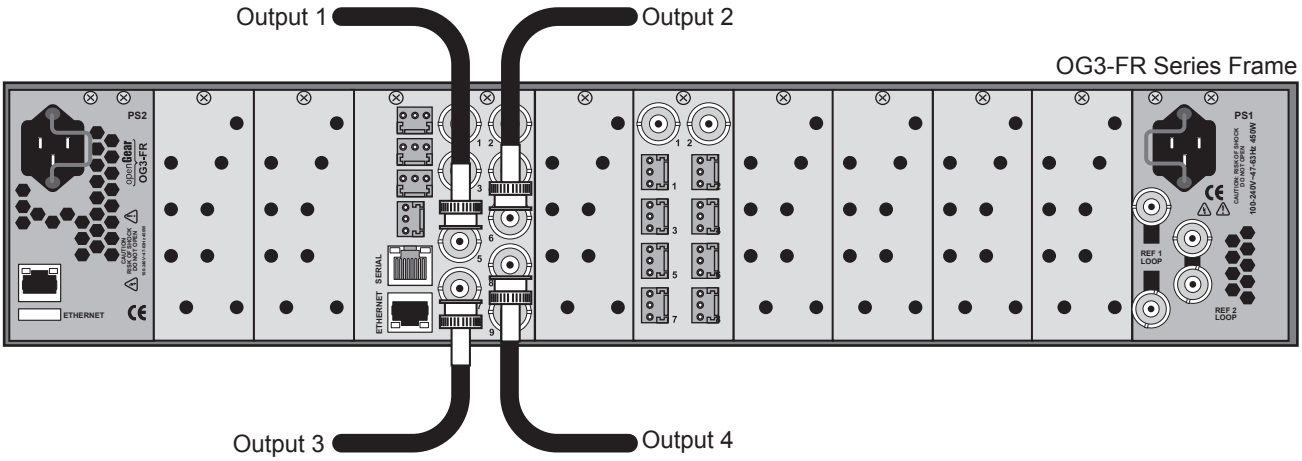


***Figure 2.7** openGear Frame Cabling — Inputs and Outputs*

Output Mapping

By default, the following MC1-MK outputs are mapped as follows:

Table 2.2 MC1-MK to Router Mapping

MC1-MK Input	Router Source
Output 1 (BNC 5)	Program
Output 2 (BNC 6)	Program
Output 3 (BNC 7)	Preview
Output 4 (BNC 8)	Clean Feed 1

For More Information on...

- output mapping, refer to the section "**Selecting the Sources**" on page 4-2.

Reference Cabling

Connect the reference source for MC1-MK as illustrated in **Figure 2.8**. Ross Video does not supply this cable.

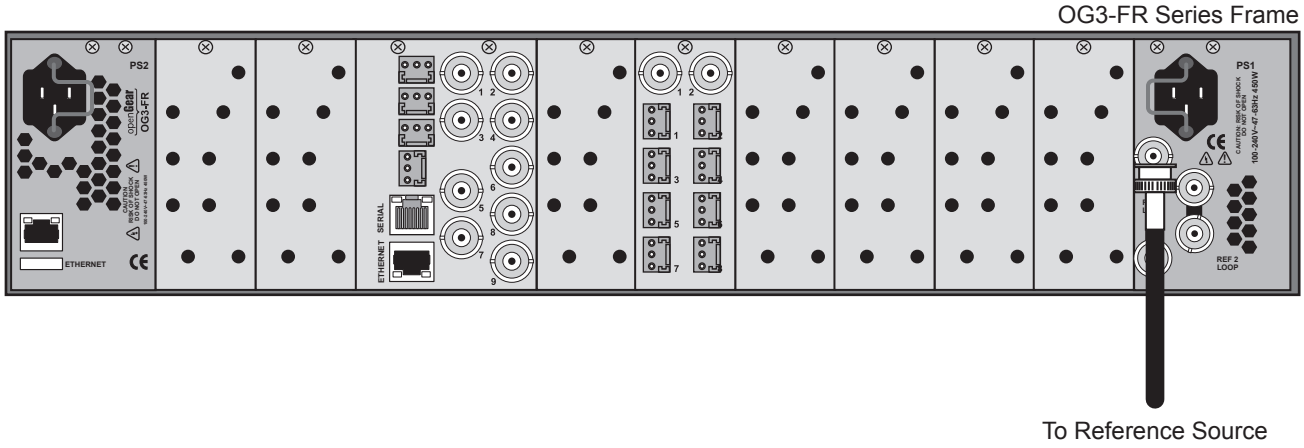


***Figure 2.8** Cabling — Reference Input*

Ethernet Communications

The MC1-MK communicates over an ethernet connection to the router, and EAS. The **Ethernet 10/100** port on the Rear Module is also used for software upgrades, and media file transfers. The exact steps for connecting to your facility via an ethernet network depends on the network requirements of your facility. Note that in addition to the **Ethernet 10/100** port on the Rear Module, you must also provide an ethernet connection to the openGear frame as outlined in the ***OG3-FR Series Frames User Manual***. Set up of ethernet connections between the devices, such as a router, and the MC1-MK are outlined in later chapters of this manual.

Important — *Ross Video strongly recommends installing your Master Control System on a network that is segregated from your facility LAN.*

Ethernet Cabling for the MC1-MK

Contact your IT Department before connecting to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP Address, Subnet Mask, and Gateway for the MC1-MK.

You will require a standard network CAT-5 cable to connect the MC1-MK to your facility network. (**Figure 2.9**) There is no need for a crossover cable as the MC1-MK includes an Auto-MDIX ethernet PHY that will switch from straight to crossover automatically as needed. Ross Video does not supply these cables.

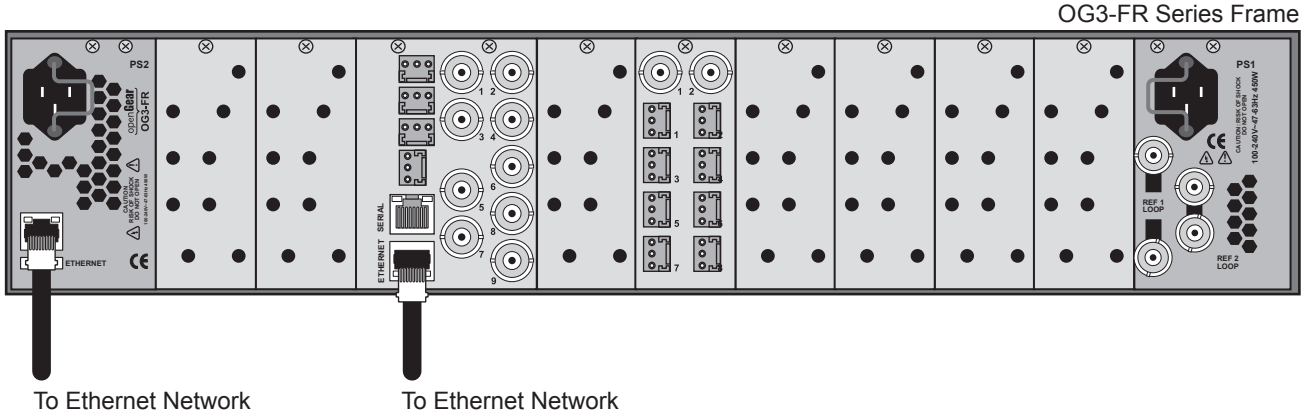
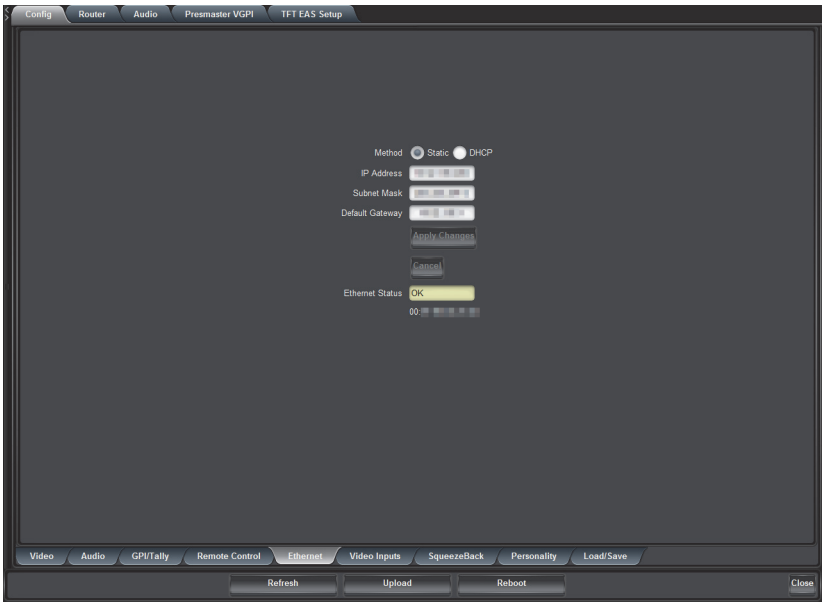


Figure 2.9 *MC1-MK — Ethernet Connection*

To set up ethernet communications for the MC1-MK

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Ethernet** tab located at the bottom of the **Config** tab.



Config — Ethernet Tab

5. If you are manually configuring the ethernet settings:
   - Select **Static**.
   - Enter the **IP Address**, **Subnet Mask**, and **Default Gateway** settings for the card.
   - Ross Video recommends using a static IP Address.
6. If you want network settings to be automatically obtained, select **DHCP**.
7. Click **Apply Changes** to save the new settings.

GPIO/Tally Setup

The MC1-MK has eight bi-directional pins labeled GPI/O 1-8 on the terminal block of the Rear Module. Ports are user programmable to be either an input (GPI) or an output (Tally) using the **GPI/Tally Setup** tab in DashBoard. Electrically, the ports are setup for contact closure to ground, with 4.75kohm pull-up resistor to +5V, so they default to a logical high state.

For More Information on...

- on the pinouts for the GPI/O ports, refer to the section "**GPIO Connections**" on page 9-5.

GPI/Tally Cabling

The GPI ports are available on four 3-pin connectors located on the Rear Module. The 3-pin mating connectors are provided with the Rear Module. The default state for the GPI/O contacts is active low signaling. This way, if the card is removed from the openGear frame, no external events will be inadvertently asserted by the card. This also means that if a GPI cable is absent from the Rear Module, no GPI or Tally will be triggered and executed inadvertently by the card.

8320AR-033 Cabling

Refer to **Figure 2.10** for GPI designations when using the 8320AR-033 Rear Module.

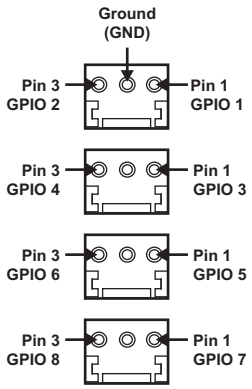


***Figure 2.10** GPI Connections — 8320AR-033 Rear Module*

8320AR-055 Cabling

Refer to **Figure 2.11** for GPI designations when using the 8320AR-055 Rear Module.

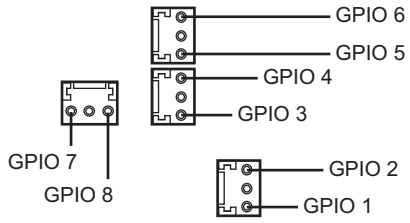
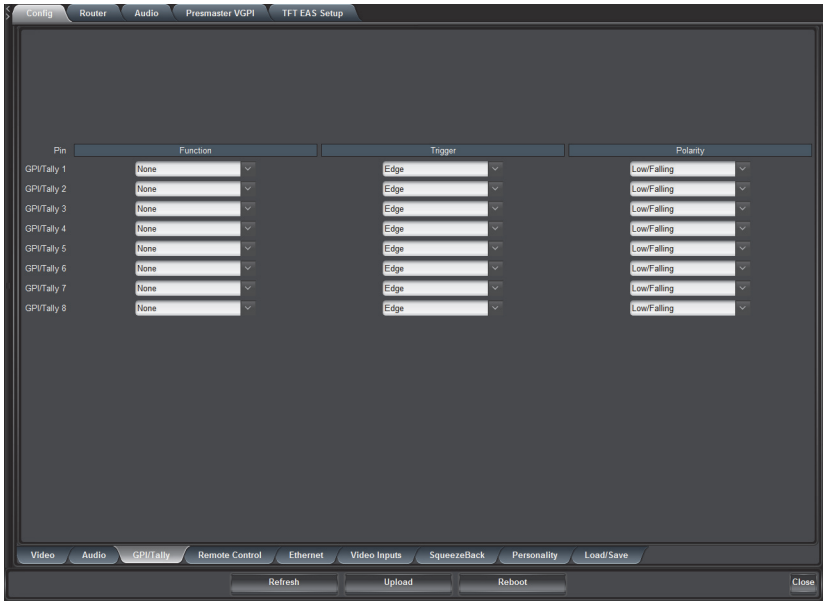


***Figure 2.11** GPI Connections — 8320AR-055 Rear Module*

To set up GPI/Tally communications for the MC1-MK

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **GPI/Tally** tab located at the bottom of the **Config** tab.



Config — GPI/Tally Tab

5. To configure a port as a GPI:
   - Assign a transition event to a GPI by selecting the function next to the GPI in the **GPI/Tally** area.
   - Select a trigger for the GPI from the **Trigger** column.
   - Select a Polarity for the GPI from the **Polarity** column.
6. To configure a port as a tally:
   - Select what will drive the tally output when the input is on-air by selecting the function next to the **Tally** in the **GPI/Tally** area.
   - Select the polarity of the tally from the **Polarity** column.

For More Information on...

- the **GPI/Tally** tab, refer to the section "**GPI/Tally Tab**" on page 8-8.

Linear Timecode Setup

The MC1-MK provides the option to receive Linear Timecode (LTC) on the **Serial COM** port, or via the **GPI** pins, then decodes and keys the timecode over the Background video. The outgoing video signal is rendered with a known and constant delay. This section describes the two methods of cabling an LTC input to the MC1-MK: via the **Serial COM** port, or via one of the **GPIO** ports, on the rear module. Note that how you connect to the LTC device determines how you must configure the communications between the LTC device and your card.

Note — *If you are using an automation system that requires a serial connection, you will need to connect your LTC device using the GPIO connectors.*

Serial Setup

Use the **Serial COM** port when the LTC device drives a balanced pair, following the recommended voltage amplitude defined in the SMPTE 12M specification. The LTC signal pair must be connected to the **Serial COM** port on the Rx+ and Rx- input pins. Ross Video does not supply this cable.

For More Information on...

- the **Remote Control** tab, refer to the section "**Remote Control Tab**" on page 8-10.

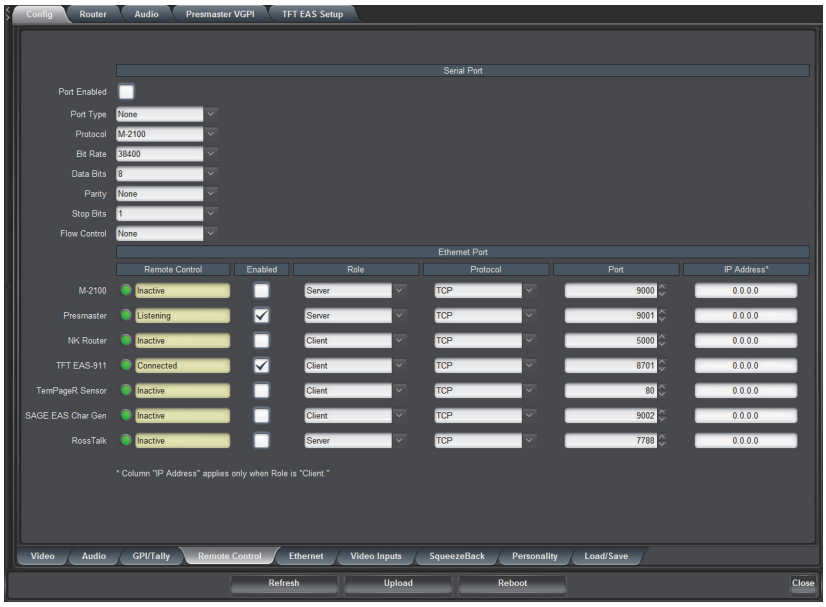
Cabling for the Serial COM port

You will need a cable with an RJ-45 connector on one end (connects to the **Serial COM** port on the MC1-MK rear module). Refer to the user manual for your LTC device for specific pinout information and the required port to use. Refer to **Table 9.4** on page 9-4 for cabling details.

Notice — *Pins 4 and 5 on the 8320AR-033 rear module provide +12V @ 0.2A. Do not connect these pins if unused, these pins must be left unterminated (floating).*

To configure serial communications for an LTC input

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Remote Control** tab located at the bottom of the **Config** tab.



Config — Remote Control Tab

5. Select **Timecode** from the **Protocol** box.
6. Select **RS 422 unterm** from the **Port Type** box.
7. Select the **Port Enabled** box. Note that when the Port is disabled, any incoming data on the serial port is discarded by the card. The **Bit Rate, Data Bits, Parity** and **Stop Bits** fields are ignored.

GPI Setup

The GPI ports are available on four 3-pin connectors located on the Rear Module. Ross Video does not supply these cables.

Note — *When using a GPI port for LTC, the LTC interface must be TTL compatible where V (IH) is 2.0V-5.0V, and V(IL) is 0.0V-0.8V.*

For More Information on...

- the **GPI/Tally** tab, refer to the section "**GPI/Tally Tab**" on page 8-8.

Cabling for a GPI Port

Use one of the **GPIO** ports when the LTC device drives a single-ended TTL compatible signal. The left and right pins are the two GPI/O signals while the center pin is the common Ground (GND). Refer to the section "**GPI/Tally Cabling**" on page 2-14 for cabling details.

To configure GPI communications for an LTC input

Note — *Ensure that only one GPI port is configured as an LTC input at one time. If you attempt to configure a second GPI port for timecode communications, the first GPI will be automatically assigned to* ***None****.*

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.

4. Select the **GPI/Tally** tab located at the bottom of the **Config** tab.
5. From the **Function** box for the GPI you are configuring, select **Timecode Input**. The **Trigger** and **Polarity** fields are ignored.

Device Control

The MC1-MK can communicate with a number of external devices, such as EAS and automation systems.

For More Information on...

- how to set up communications with these devices, refer to the Setup Sheets provided on the ***MC1-MK Documentation Resources CD*** that came with your MC1-MK.
- how to set up and configure communications with a router, refer to the chapter "**Router Setup**" on page 3-1.

Router Setup

In This Chapter

This chapter provides instructions for the basic physical installation and communications setup of your router to the MC1-MK. It is recommended to consult your router documentation for specific information on installing and configuring your router.

The following topics are discussed:

- Cabling
- Communications Setup
- Source Mapping

Cabling

This section briefly summarizes how to cable the NK Series router to communicate with the MC1-MK. Note that your facility requirements may differ from what is presented here.

Connections for the Primary NK-IPS

Figure 3.1 illustrates the connections between a RCP-NKM, a Ross router, NK-VRC, and a (primary) NK-IPS when setting up the MC1-MK. Ross Video does not supply these cables.

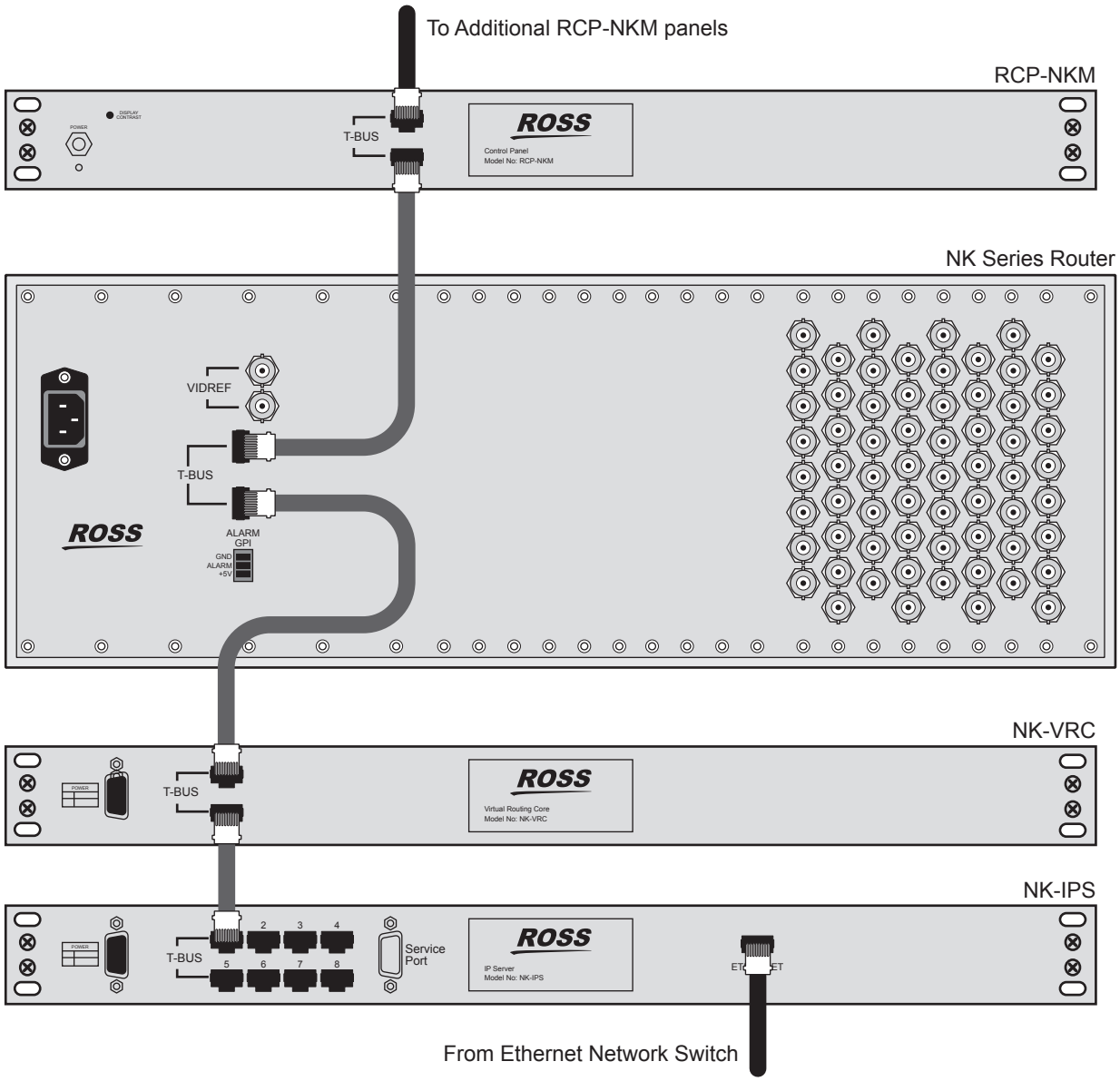


***Figure 3.1** Connections for the Primary NK-IPS*

Connections for a Secondary NK-IPS

When using an automation device that requires a serial connection to communicate with your NK Series router, you will also need to connect your device to a NK-3RD which then connects to a second NK-IPS. (**Figure 3.2**) Note that this second NK-IPS communicates via ethernet to the first NK-IPS you setup in **Figure 3.1**.

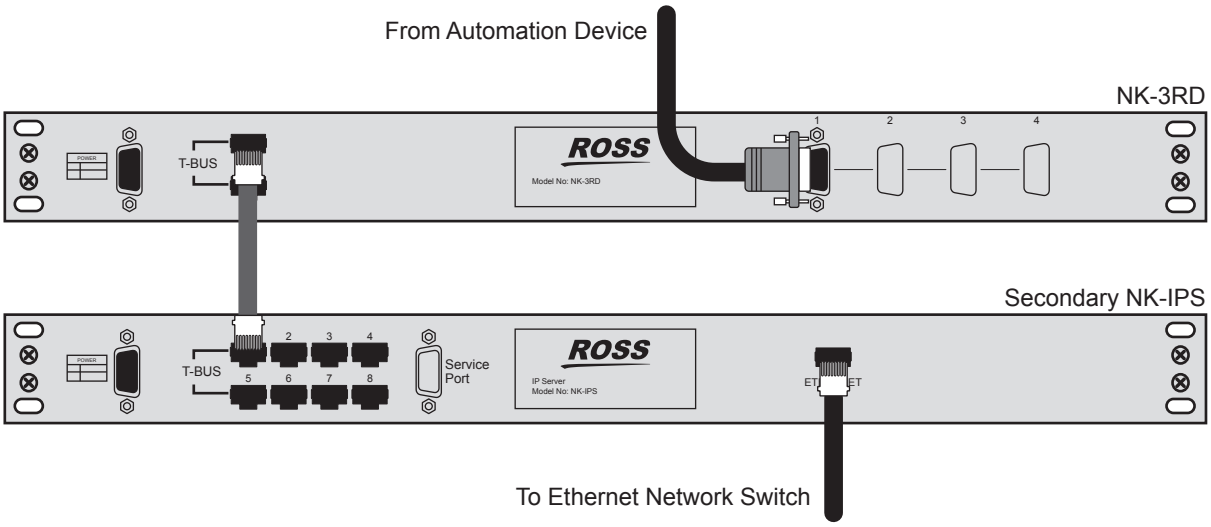


Figure 3.2 *Connections for a Secondary NK-IPS*

Communications Setup

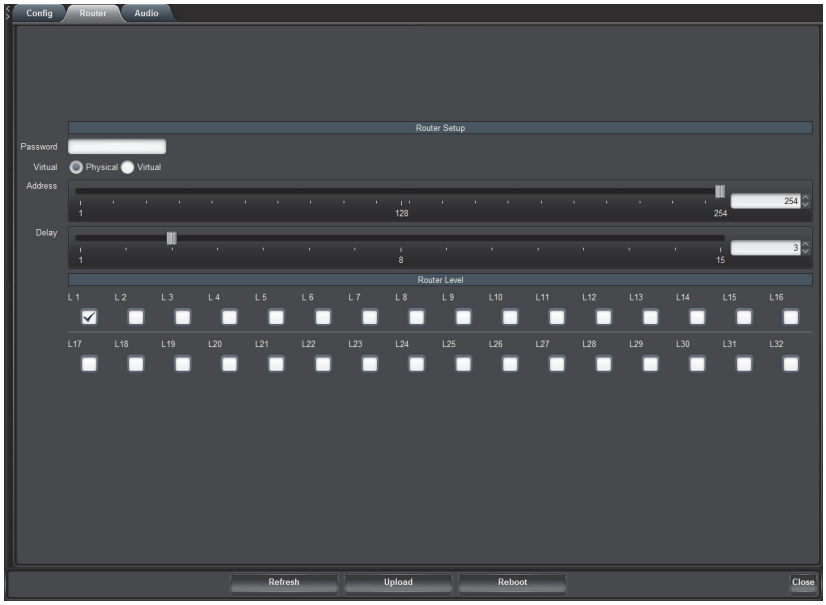
Communication between MC1-MK and the NK-IPS is via an ethernet connection. This section outlines how to configure the MC1-MK to communicate with the router via an ethernet protocol. Before proceeding, ensure that the NK-IPS is set up for ethernet communications by referring to its user manual.

For More Information on...

- the **Remote Control** tab, refer to **Table 8.8** on page 8-10.
- the **Router** tab, refer to **Table 8.17** on page 8-22.

To establish communications between a router and the MC1-MK

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Router** tab.



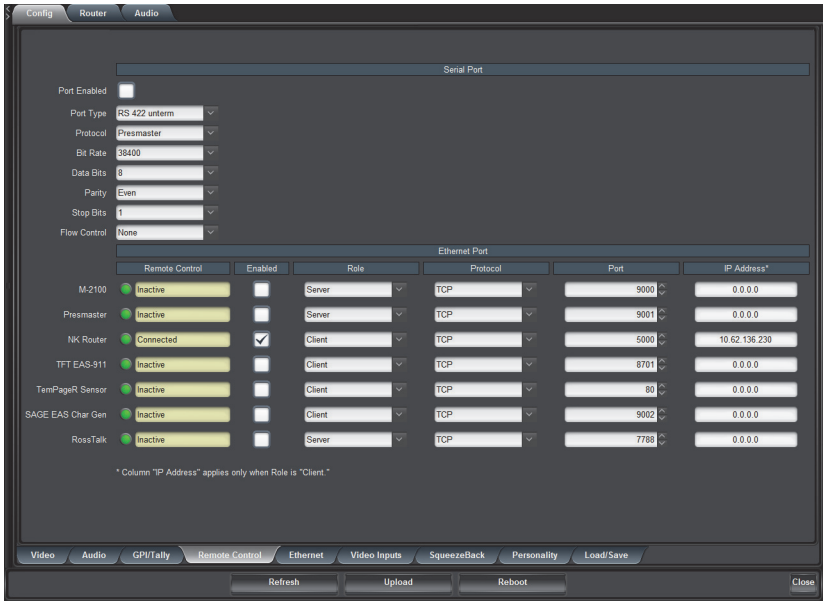
Router Tab

4. If you have locked your NK-IPS from its interface, you must enter the required password in the **Password** field in the **Router** tab of DashBoard.
5. Specify how crosspoints are interpreted by selecting an option from the **Virtual** menu. Select **Virtual** if you are using an NK-VRC, as outlined in **Figure 3.1**.
6. Specify the length of time, in frames, that the MC1-MK will wait after sending a command to the router by entering a value in the **Delay** field.
7. Specify the T-Bus address to be used by the MC1-MK in the **Address** field.

To specify the communications protocol for MC1-MK

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.

3. Select the **Remote Control** tab located at the bottom of the **Config** tab.



Config — Remote Control Tab

4. Locate the **NK Router** row in the **Ethernet Port** area of the tab.
5. From the **Role** menu, select **Client**.
6. From the **Protocol** menu, select **TCP**.
7. From the **IP Address** menu, specify the T-Bus address assigned to the MC1-MK. Note that this is typically the default address of 254 which is the same as the NK-IPS or any available unassigned T-Bus address.[1]
8. From the **Port** menu, specify the port number of the NK-IPS. Note that the standard port used by NK-IPS is 5000.
9. Select the **Enabled** box.

1. When using Virtual Resource Management, the T-Bus address is set in the V-Core. Check all your NK devices to see which T-Bus address(es) are assigned to your devices and ensure that you do not specify these addresses in the IP Address field for the MC1-MK.

Source Mapping

Any router source can be mapped to any crosspoint button on the MC1-MK On Air Control interface using the options in the **Video Inputs** tab. Each crosspoint button can have two inputs assigned: the video source and an optional alpha source. The alpha source is used only when selecting an external key.

Output Mapping

Four SDI video signals are normally sent from the router to the MC1-MK. These are Program, Preset, Key Video, and Key Alpha. In order for the MC1-MK to send the correct switch commands to the router, it must know which router outputs correspond to the four SDI signals. This section enables you to specify this information.

Note — *When interfacing the MC1-MK to an NK Series router with Resource Management, it may be necessary to limit the number of router outputs controlled by the MC1-MK.*

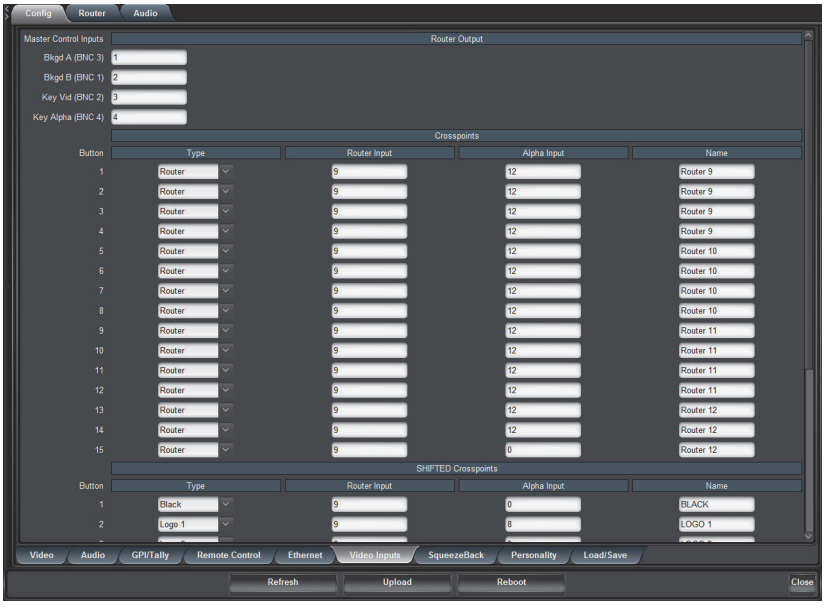
If there are less than four format converters available, then the external key inputs of the MC1-MK must be set to zero (0). Otherwise a resource conflict may arise and this could prevent the Program or Preset bus from switching.

For More Information on...

- output cabling, refer to the section "**Video Connections**" on page 2-9.

To map router output sources to MC1-MK inputs

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Video Inputs** tab located at the bottom of the **Config** tab.



Config — Video Inputs Tab

4. For each of the four SDI signals, enter the router output number in the **Router Output** field. The MC1-MK will use this value when sending switch commands to the router.
   - A value of zero (0) disables the router functionality. Use this option in situations where there are not sufficient resource converters available on the router.
   - Positive numbers (1 and up) are assumed to be valid router crosspoints. For an NK series router, the maximum value is 32767. For other routers it may be larger or smaller. The MC1-MK does not validate the number, so you must ensure that the correct value is entered.

Crosspoint Mapping

The MC1-MK is shipped with a factory default mapping for the available inputs to the crosspoint buttons on the DashBoard control panel. **Table 3.1** outlines the default crosspoint mapping. However, you can also change the sources assigned to the router destinations that are associated with the MC1-MK using the options in the **Video Inputs** tab.

For More Information on...

- the menu items in the **Video Inputs** tab, refer to **Table 8.12** on page 8-16.

Table 3.1 Default Crosspoint Mapping

Crosspoint Button	Unshifted Row	Shifted Row
1	Black	Black
2	Router 1	Router 7
3	Router 2	Router 8
4	Router 3	Router 9
5	Router 4	Router 10
6	Router 5	Router 11
7	Router 6	Router 12
8	Logo 1	Logo 3
9	Logo 2	Logo 4
10	RTR Extra 1	RTR Extra 2
11	SHIFT	SHIFT

Mapping the RTR Extra Buttons

By default, there are two **RTR Extra** buttons, with one mapped to each row. These buttons are provided for when your Automation system requires switches between more router sources than can be mapped to the MC1-MK crosspoint buttons. When you have more than 18 router sources to switch between, the Automation system polls the MC1-MK crosspoint rows to see if the router source is already assigned to a crosspoint button. If it is not, then the Automation system searches for a crosspoint that is assigned as **RTR Extra** and uses it to make the switch between router sources.

If you are not using an Automation system, or have less than 18 router sources to switch, you may wish to re-map these buttons to other functions. Otherwise it is recommended to keep the default mapping of one **RTR Extra** button per crosspoint row.

To map a crosspoint button in MC1-MK

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Video Inputs** tab located at the bottom of the **Config** tab.
4. In the provided list, locate the crosspoint button you want to assign a video signal to.
5. Use the options in the **Type** menu to configure the crosspoint.
6. If you selected **Router** in the **Type** menu, use the **Router Input**, and **Alpha Input** fields as required.
7. Use the **Name** field to change the displayed name if required.

MC1-MK Configuration

In This Chapter

This chapter provides instructions for configuring the MC1-MK using the options available in the DashBoard Control System.

The following topics are discussed:

- Selecting the Sources
- SqueezeBack Setup
- Additional Configuration
- Using Multiple MC1-MK Cards
- Using the Presmaster Protocol for VGPIs
- Software Upgrades

Note — *Before proceeding, ensure that you are running DashBoard software version 6.2.0 or higher. The DashBoard Control System software and user manual are available to download from the Ross Video website.*

Selecting the Sources

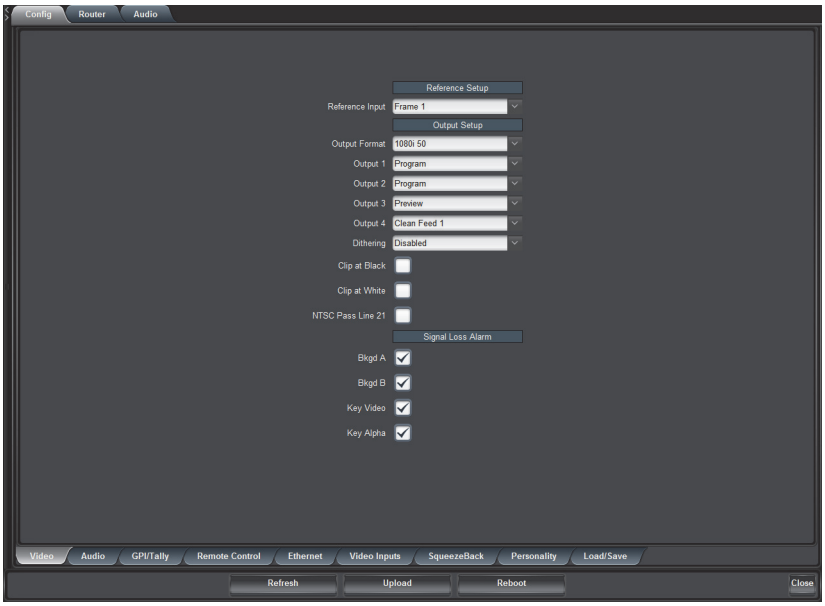
This section provides information for selecting the video format and the reference source for your card.

For More Information on...

- configuring your video inputs and outputs, refer to the section "**Video Characteristics**" on page 9-6.
- assigning MC1-MK inputs to router outputs, refer to the section "**Crosspoint Mapping**" on page 3-7.
- the Signal Loss Alarm options, refer to the **Table 8.4** on page 8-5.
- the type of messages displayed in the **Timing** fields, refer to **Table 8.1** on page 8-2.

To select the video format and reference source

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Video** tab located at the bottom of the **Config** tab.



Config — Video Tab

5. Select a reference source from the **Reference Input** menu.
6. Select the card output video format from the **Output Format** menu. Ensure that it is the same format as in the input video format.

Operating Tip — *Use the **Signal** tab to monitor the Signal status, including the reference and the Background sources. Refer to the section "**Signal Tab**" on page 8-2 for more information.*

To configure your video outputs

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Video** tab located at the bottom of the **Config** tab.
5. From the **Output Setup** area, locate the Output BNC you want to configure.
6. Select the output type for the four SDI outputs (on the rear module) from the **Output** field.
7. From the **Dithering** field, select the type of dithering you want to apply to all outputs.
8. Enable the Clip at White or Clip at Black feature(s) as required. Refer to **Table 8.4** on page 8-5 for details on these features.
9. Enable the **NTSC Pass Line 21** when using NTSC (480i) video format and when Line 21 contains closed captions.

To set up the signal loss alarm feature

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Video** tab located at the bottom of the **Config** tab.
4. Enable or disable the alarms by selecting or clearing the required boxes in the **Signal Loss Alarm** area as needed.

SqueezeBack Setup

The MC1-MK can be used to perform on-air SqueezeBack transitions to reveal another video source or graphic. If you wish to include a SqueezeBack with your transitions, you must first specify the key order using the **SqueezeBack** tab, a sub-tab of the **Config** tab.

For More Information on...

- the options in the SqueezeBack tab, refer to **Table 8.13** on page 8-17.

Specifying the Key Order

You can select the SqueezeBack point in the mixer tree. There are five possible options. The figures below shows some of the options. This setting is applied to all SqueezeBacks.

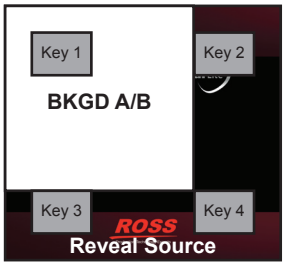


Figure 4.1 *Background Only*

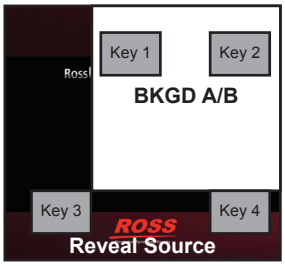


Figure 4.2 *After Key 2*

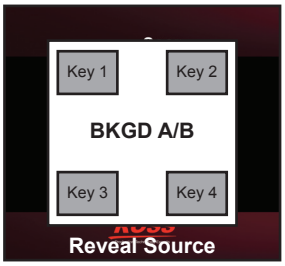
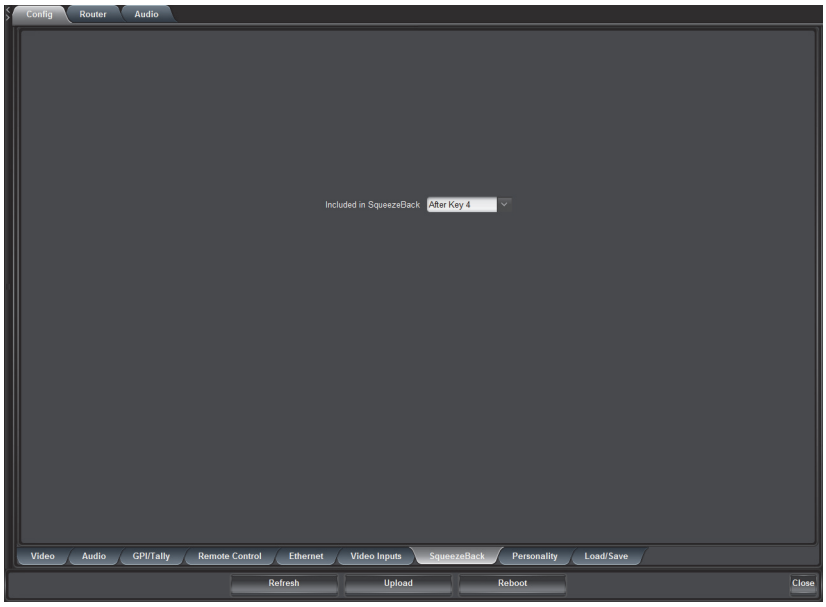


Figure 4.3 *After Key 4*

To specify the key order of the SqueezeBacks

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **SqueezeBack** tab located at the bottom of the **Config** tab.



Config — SqueezeBack Tab

4. Use the **Included in SqueezeBack** menu to specify the key order.

Configuring a Tally for a SqueezeBack

You can configure an on air tally for the reveal source. This tally will be raised regardless of the configured source. This is useful when a graphics stations is providing the video and needs to know when to trigger a play of an animation.

To configure a tally for SqueezeBack

1. Set up your tally as outlined in the section "**GPI/Tally Cabling**" on page 2-14.
2. From the **Tree View**, expand the node for the MC1-MK you want to access.
3. Select the **Configuration** node to display the interface in the right-half of DashBoard.
4. Select the **Config** tab.
5. Select the **GPI/Tally** tab located at the bottom of the **Config** tab.
6. To configure a tally port:
   - Select **Tally SqueezeBack** from the **Function** column for the tally you wish to configure.
   - Select the polarity of the tally from the **Polarity** column.

Configuring GPI Control of SqueezeBacks

You can trigger a SqueezeBack using a GPI trigger.

To configure a GPI for SqueezeBacks

1. Set up your GPI as outlined in the section "**GPI/Tally Cabling**" on page 2-14.
2. From the **Tree View**, expand the node for the MC1-MK you want to access.
3. Select the **Configuration** node to display the interface in the right-half of DashBoard.
4. Select the **Config** tab.
5. Select the **GPI/Tally** tab located at the bottom of the **Config** tab.
6. To configure a GPI:
   - Select the **GPI SqueezeBack #** in the **Function** column for the SqueezeBack you wish to trigger using the GPI you set up in 1.
   - Select the polarity of the tally from the **Polarity** column.

Additional Configuration

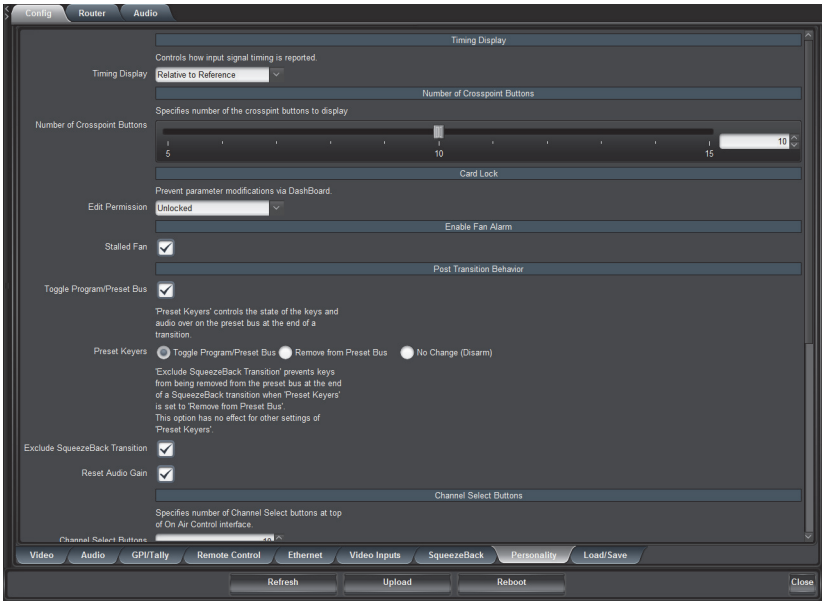
This section outlines additional communication setup such as how to configure edit permissions, and reset the MC1-MK to the default values.

Configuring the Edit Permissions

The **Personality** tab in DashBoard enables you to lock the card permission so that parameters are read-only and cannot be changed.

To configure the card edit permissions

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Personality** tab located at the bottom of the **Config** tab.



Config — Personality Tab

5. Choose an option from the **Edit Permission** menu.

Configuring the Input Signal Timing Display

The **Timing Display** feature enables you to configure how the input signal timing is reported by DashBoard. This information is displayed in the **Bkgd A, B, Key Video,** and **Key Alpha Timing** fields of the **Signal** tab in the number of clocks and lines. Negative values indicate the input signal timing is earlier than the reference. Positive values indicate the input signal timing is later than the reference.

To configure the input signal timing for your card

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.

3. Select the **Config** tab.
4. Select the **Personality** tab located at the bottom of the **Config** tab.
5. Configure how the signal timing is reported by selecting an option from the **Timing Display** menu.

Loading the Factory Defaults

If required, the card menu parameters can be reset to the factory default values using the option available in the **Load/Save** tab. All parameters are reset except those listed in **Table 8.16** on page 8-21.

To reset the card to the factory default settings in DashBoard

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Load/Save** tab located at the bottom of the **Config** tab.
5. From the **Global Settings** area, click **Load Factory Defaults** to display the **Confirm** dialog.
6. Click **Yes** to load the factory default values for all menu parameters, or **No** to cancel the load and close the dialog.

Auto Swapping of Program and Preset Buses

A personality option is provided that allows the user to specify the behavior of the Program and Preset buses after a transition. You can choose to have the Program and Preset bus flip-flop after a transition (default setting), or have the Preset bus unchanged after a transition.

To swap the buses after a transition

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Personality** tab located at the bottom of the **Config** tab.
5. From the **Post Transition Behavior** area, select the first **Toggle Program/Preset Bus** box.

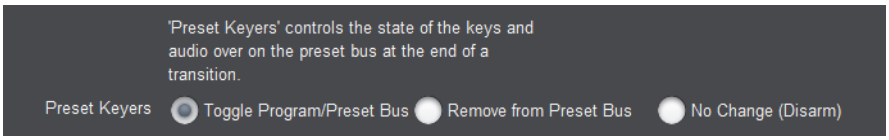
Specifying the Preset Keyers Behavior

The Preset Keyers personality option allows the user to specify the behavior of the keyers and the Audio Over on the Preset bus after a transition.

Note — *This affects all Keyers unless EAS is enabled (on the Remote Control tab). When EAS is enabled, only Keyers 1-3 are affected.*

To configure the Preset Keyers option

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Personality** tab located at the bottom of the **Config** tab.


'Preset Keyers' controls the state of the keys and audio over on the preset bus at the end of a transition.
Preset Keyers
Toggle Program/Preset Bus
Remove from Preset Bus
No Change (Disarm)

Personality Tab — Preset Keyers Options

5. From the **Post Transition Behavior** area, select the one of the following **Preset Keyers** options:
   - **Toggle Program/Preset Bus** — The keyers will automatically flip-flop between Program and Preset after a transition.
   - **Remove from Preset Bus** — The keyers on the Preset bus will be turned off automatically after a transition. The operator must manually select the keyer(s) to be included in the next transition. If you select this option, enabling the Exclude SqueezeBack Transition feature will stop keys from being disarmed at the end of a Squeeze transition.
   - **No Change** — The Preset bus is unchanged after a transition.

Disabling the Fade to Black Button

You can disable the functionality of the Fade to Black (**FTB**) button on the On Air Control interfaces and the physical button on the MC1-PANEL-16 chassis. Once disabled, pressing the button has no effect.

Note — *Ensure that **FTB** is not selected or in use before disabling its function. Disabling the button while it is selected (active) locks the on-air output to black.*

To disable the FTB button

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Personality** tab.
5. To disable the **FTB** button, select the **Disable FTB** option. You may need to scroll to the bottom of the tab to located this option.

Automation Switch Requests

When the MC1-MK interfaces with an Automation System, you can choose how the MC1-MK defines automation switch requests. This feature applies to the Program bus, Preset bus, and external sources. Ensure the **ATMN** button is toggled to **ON** to enable your automation device to control the MC1-MK. This button is located on the **On Air Control** interface.

To define the automation switch requests

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Personality** tab.
5. From the **Automation Switch Request** area, select how a crosspoint switch is defined:
   - **Router Crosspoint** — The received value refers to a physical or virtual router crosspoint. This is the default setting.
   - **Button Map** — The received value refers to a specific MC1-MK crosspoint button on the DashBoard control panel. Note that these crosspoint buttons are defined in the **Video Inputs** tab.

To define the TAKE button behavior for automation

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Personality** tab.
5. From the **Take Button on Panel** area, define the behavior of the **TAKE** button for automation:
   - **Take** — No change to the **TAKE** button behavior. This is the default setting.
   - **Take Next** — The **TAKE** button sends a new tally to the automation device *instead* of performing a Take transition. The **TAKE** button in the On Air Control interface is now re-named to **TAKE NEXT**. The MC1-MK uses the same tally to inform the automation device the state of the **ATMN** button of the MC1-MK as outlined in the section "**Pre-Roll and Take Command**" on page 10-6.

Specifying the Number of Available Crosspoints

This number is in addition to the **Shift** button.

To specify the number of available crosspoints

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Personality** tab.
5. Use the **Number of Crosspoints** slider to specify:
   - the number of crosspoint buttons to display in the Active Channel On Air Control interface, and

- the number of active crosspoint buttons on the MC1-MK chassis. Buttons that are unavailable are unlit on the physical panel.

Using Multiple MC1-MK Cards

When using multiple MC1-MK Master Control Switchers, it may be desirable to control any MC1-MK from a DashBoard console. To facilitate switching between multiple MC1-MK cards, a row of dedicated Channel Select buttons is provided in the upper left of the On Air Control interface. You can change the icons displayed in the Channel Select Buttons, the Basic Tree View node, and the Home tab by updating the corresponding graphic files stored on the MC1-MK card.

This section outlines how to update the icons for an MC1-MK and how to assign a MC1-MK Master Control Switcher to a Channel Select button.

Updating the Icons

It is intended for users to update the icon graphics for each MC1-MK with their own versions, particularly if they have more than one MC1-MK. For example, you may wish to identify each MC1-MK by using a specific station logo. This section summaries the graphic files used by a card.

Overview of the Graphic Files

The graphic files are stored on the CompactFlash™ of the MC1-MK in a top-level directory on the card named **ross**. Note that the underlying file system (ext3) is case-sensitive, and that both the directory and the filenames are lower-case. Inside the **ross** directory there are three files, containing icons (station logos) in various sizes. (**Table 4.1**) When replacing the content of these files, ensure that the image dimensions remain the same. For best results, also ensure that these images have a transparent background.

Table 4.1 Image Files for Multi-Channel Setups

Filename	Image Dimensions	Used for...
station_logo_icon.png	16 x 16 pixels	Basic Tree View node icon
station_logo_small.png	50 x 50 pixels	Channel Select button icon
station_logo_large.png	450 x 250 pixels	On Air Controls, Home tab icons

Managing the Graphic Files

Use an FTP client to connect to the MC1-MK and replace the graphic files stored on the card. This is exactly the same procedure as is used to load other graphics files to logo channels on the MC1-MK. Refer to the ***MC1-MK Operation Manual*** for details.

Once new files are transferred to the MC1-MK via FTP, they will immediately be used. However, DashBoard software caches the images and may not display the new icons right away. Refreshing the card (click the **Refresh** button), or restarting DashBoard, generally fixes this problem.

Configuring the Channel Select Buttons

The Channel Select buttons are located in the upper left corner of each card's On Air Control interface. Until these are configured by the user, they appear as empty buttons. Clicking the empty buttons has no effect. You can specify the number of Channel Select buttons, to a maximum of 10, that display in the interface using an option in the Personality tab.

These buttons allow you to toggle between the On Air Control interfaces of multiple MC1-MK Master Control Switchers. Selecting a button displays the corresponding MC1-MK **On Air Control** interface in DashBoard. A lit button indicates that the corresponding On Air Control interface is the currently active card in DashBoard.

Prior to configuring the Channel Select buttons, each MC1-MK should be given a custom set of icon (station logo) graphics as described in the previous section. Channel Select buttons will operate with the default logos, but it may be confusing to the operator.

It is highly recommended to consistently assign MC1-MK cards to the Channel Select buttons. For example, assigning the same MC1-MK to the first Channel Select button regardless of the On Air Control interface ensures that the clicking the first Channel Select button displays the same MC1-MK.

To specify the number of Channel Select buttons

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Personality** tab located at the bottom of the **Config** tab.
5. Specify the number of buttons to display in the On Air Control interface of that MC1-MK by typing the number into the **Channel Select Buttons** field.
6. Repeat steps 1-4 for each MC1-MK you wish to configure.

To configure the first MC1-MK

1. Display the **On Air Control** interface of the first MC1-MK as follows:
   - From the **Tree View**, expand the node for the first MC1-MK you want to access.
   - Expand the node for the first MC1-MK.
   - Double-click its **On Air Control** node.
2. Return to the **Tree View**.
3. Assign the first MC1-MK to the first Channel Select button as follows:
   - Select the **On Air Control** node and keep the mouse button pressed.
   - Drag the node over the first Channel Select button. Notice the mouse pointer changes shape when over the target button.
   - Release the mouse button. The Channel Select button updates to show the appropriate logo for the first MC1-MK.
4. Repeat step 3 for the second MC1-MK, but ensuring to assign the second MC1-MK to the second Channel Select button.
5. Assign each additional MC1-MK to a button in **On Air Control** node of the first MC1-MK. Refer to **Figure 4.4** for an example of a possible button mapping.

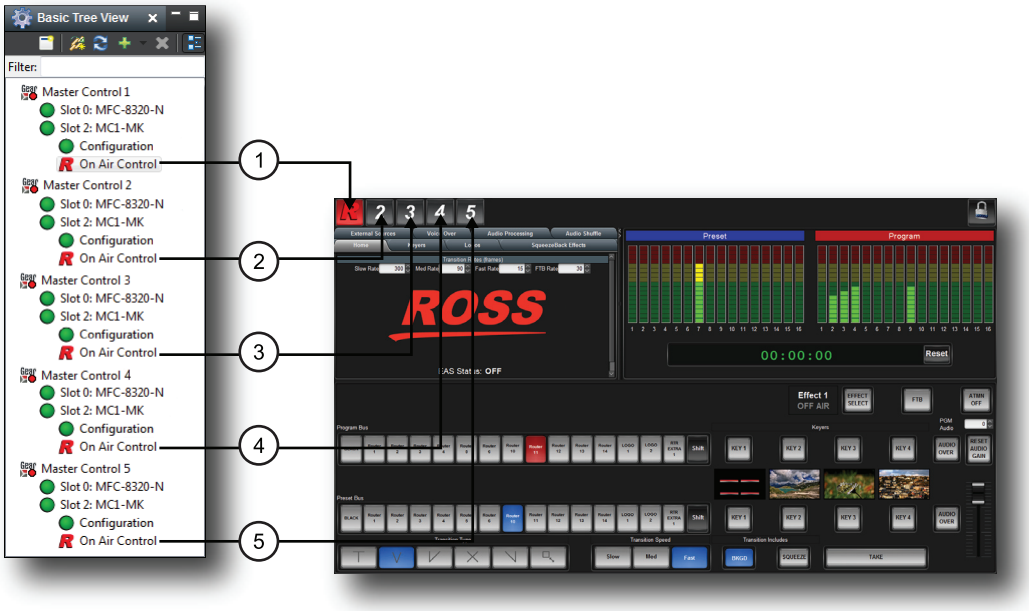


***Figure 4.4** Example of Assigning Multiple MC1-MK to Channel Select Buttons*

To set up additional MC1-MK

1. Display the **On Air Control** interface of the next MC1-MK as follows:
   - From the **Tree View**, expand the node for the next MC1-MK.
   - Double-click its **On Air Control** node.
2. Return to the **Tree View**.
3. Drag the On Air Control node of the first MC1-MK to the first Channel Select button on the next MC1-MK On Air Control interface.
4. Drag the On Air Control node of the second MC1-MK to the second Channel Select button on the next MC1-MK.
5. Repeat for each additional MC1-MK to add the buttons to the On Air Control interface for each MC1-MK. Refer to **Figure 4.4** for an example of a possible button mapping.

Notes on Using Multiple MC1-MK Cards

When setting up the Channel Select buttons, it is important that the sequence of devices be consistent. Otherwise the buttons will appear to "move around" when toggling between interfaces. This cannot be enforced automatically, the user must be careful when setting up the buttons.

If the IP address of any MC1-MK cards changes, then the Channel Select buttons will not work correctly. Specifically, the red background color that indicates the currently active device will not be correct. It is highly recommended to use static IP addresses to avoid this problem.

If either of these problems occur, they can easily be fixed by simply repeating the procedure "**Configuring the Channel Select Buttons**" on page 4-11.

Using the Presmaster Protocol for VGPIs

The Virtual GPI (VGPI) functionality of the Miranda™ Presmaster Automation Protocol can be used to trigger squeeze on/off transitions on the MC1-MK using a specified SqueezeBack preset. This section outlines how to associate a SqueezeBack preset with one of the four VGPIs that the MC1-MK can control.

For More Information on...

- the Presmaster commands, refer to the Miranda™ Presmaster Automation Protocol documentation.
- the Presmaster VGPI commands the MC1-MK supports, refer to **Table 10.1**.
- the options in the Presmaster VGPI tab, refer to **Table 8.22** on page 8-25.
- the location of the **ATMN** button on the **On Air Control** interface, refer to the ***MC1-MK Operation Manual***.

Assigning a VGPI to a SqueezeBack Preset

When you select the Miranda™ Presmaster protocol on the Remote Control tab, the **Presmaster VGPI** tab is automatically displayed in the Device View of DashBoard. This Presmaster VGPI tab enables you to assign one of four Virtual GPIs (VGPIs) to a specific SqueezeBack preset. Note that these VGPIs are not associated with the physical GPIO ports on the rear module.

For More Information on...

- enabling the Presmaster protocol, refer to the ***openGear Miranda™ Presmaster Setup Sheet*** available on the MC1-MK Documentation Resources DVD.

To assign a SqueezeBack Preset to an VGPI

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Presmaster VGPI** tab. If the **Presmaster VGPI** tab is unavailable, verify that you have correctly installed your device and it is communicating with the MC1-MK.
4. Assign a specific SqueezeBack Preset for each VGPI using the **Function** menus.
5. Ensure the **ATMN** button is toggled to **ON** to enable your automation device to control the MC1-MK. This button is located on the **On Air Control** interface.

Software Upgrades

The card can be upgraded in the field using the **Ethernet 10/100** port on the Rear Module and using the options available in DashBoard. Refer to the section "**Ethernet Communications**" on page 2-12 for setting up ethernet communications.

To upgrade the software on a card

1. Contact Ross Technical Support for the latest software version file.
2. Ensure the ethernet cable is connected to the **Ethernet 10/100** port on the Rear Module. Refer to the section "**Ethernet Cabling for the MC1-MK**" on page 2-12 for details.
3. From the **Tree View**, expand the node for the MC1-MK you want to access.
4. Select the **Configuration** node to display the interface in the right-half of DashBoard.
5. Select **Upload**, located near the bottom of the Config tab, to display the **Select file Upload** dialog.
6. Navigate to the ***.bin** file you want to upload.
7. Click **Open**.
8. If you are upgrading a single card, click **Finish** to start the upgrade. Proceed to 10.
9. If you are upgrading multiple cards:
   - Click **Next >** to display the **Select Destination menu**. This menu provides a list of the compatible cards.
   - Specify the card(s) to upload the file to by selecting the check box(es) for the cards you want to upload the file to.
   - Verify the card(s) you want to upload the file to. The **Error/Warning** fields indicate any errors, such as incompatible software or card type mismatch.
   - Click **Finish**.
10. Monitor the upgrade.
    - An **Upload Status** dialog enables you to monitor the upgrade process.
    - Notice that each card is listed in the dialog with a button. This button is replaced with a **Reboot** button once the software file is loaded to that card.

Important — *Avoid clicking the individual **Reboot** buttons until all cards have successfully completed the file upload process and the **OK** button, located in the bottom right corner of the dialog, is enabled.*

- Click **OK** to reboot all the cards listed in the **Uploading to Selected Devices** dialog.
- The **Reboot Confirm** dialog displays, indicating the number of cards that will reboot. Click **Yes** to continue the upgrade process. Note that clicking **Cancel** or **No** returns you to the **Uploading to Selected Devices** dialog without rebooting the card(s).
- The card(s) are temporarily taken offline during the reboot process. The process is complete once the status indicators for the **Card State** and **Connection** return to their previous status.

Audio Configuration

In This Chapter

This chapter provides instructions for configuring the audio features of the MC1-MK using the options available in DashBoard. This includes how to specify audio groups to embed, applying duck and gain levels, and specifying the Voice Over source.

The following topics are discussed:

- Audio Overview
- Specifying Embedded Audio Groups
- Audio Shuffling
- Audio Processing
- Voice Over Setup
- Setting up the Audio for EAS
- Resetting the Audio Gain Level During Transitions
- Creating an Audio Profile

Note — *Before proceeding, ensure that you are running DashBoard software version 6.2.0 or higher. The DashBoard Control System software and user manual are available to download from the Ross Video website.*

Audio Overview

The MC1-MK provides the ability to independently configure the audio channel map and gain of each input (up to 16) that can be selected on the crosspoint bus, and to adjust the gain, or mute, individually, each of the 16 embedded channels. The audio processing and shuffle settings are retained on a per crosspoint basis. In addition, audio settings can be saved to one of four audio profiles that can be applied to any crosspoint during a **TAKE** transition.

For More Information on...

- automation protocol support for audio, refer to the section "**Commands**" on page 10-2.

Workflow

Figure 5.1 provides a simplified workflow diagram of the MC1-MK audio processing.

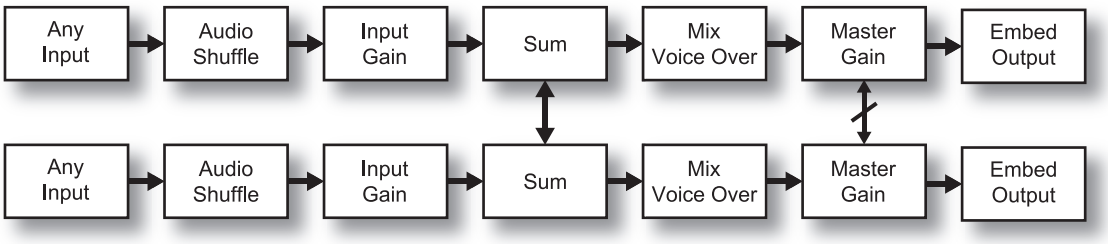


***Figure 5.1** Audio Processing Workflow*

Audio Processing

On a channel pair basis, you can:

- sum the two inputs, and apply to both outputs
- swap the input pairs
- send left channel only to both output channels in the pair
- send right channel only to both output channels in the pair
- mute both channels with the option to still select mute input on individual basis from the Audio Shuffle menu.
- adjust the gain applied to the audio input

Audio Shuffling

The MC1-MK provides the flexibility to modify the map of audio channels inside the SDI bit stream. This is useful when the incoming feed has multiple languages, with each language consisting of a channel pair.

Voice Over and EAS

The MC1-MK enables flexible audio/voice over mixing with a variable program audio duck level, audio over gain control, and preset mixing with transition control.When Voice Over or EAS is active, all channels are mixed. If the source may contain more audio channels that you want mixed, ensure to use the Mute setting for those channels.

When setting up the gain and duck levels, note that audio sources are layered with the EAS positioned downstream from the Voice Over channel. For example, applying a duck level when EAS is active, also applies that value to the Voice Over channel (if active) and the other incoming audio sources. That means when both Voice Over and EAS audio are in effect, it is possible to duck the incoming audio twice.

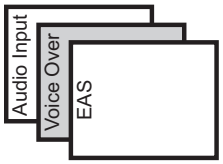


Figure 5.2 *Audio Layering*

Audio Profiles

You can define up to four audio profiles. Each profile records the audio processing and shuffling settings for all 16 embedded channels including:

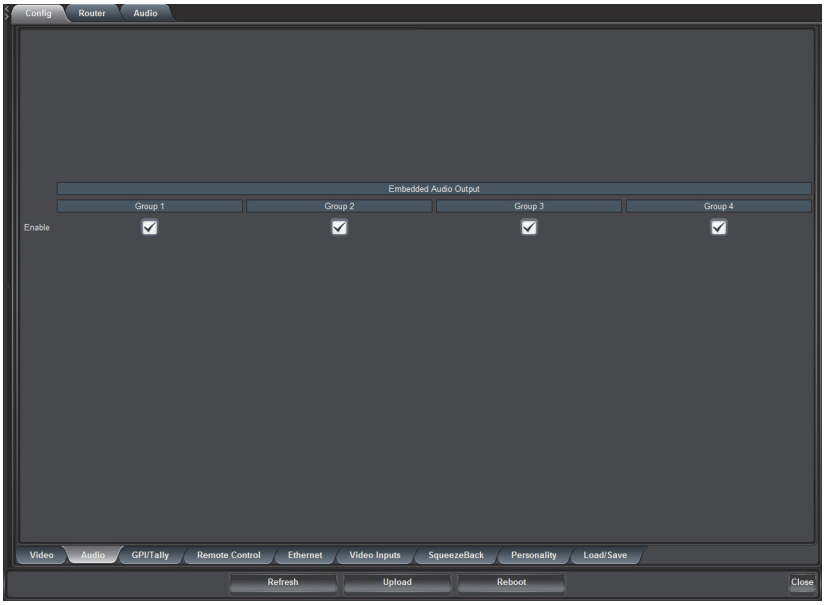
- which audio sources are re-mapped
- gain to the input(s)
- embedded audio source
- pass mode (enabled or disabled)
- mute (enabled or disabled)
- which channels are inverted (or not)

Specifying Embedded Audio Groups

The **Audio** tab enables you to specify which audio group is embedded in the output.

To specify which audio groups to embed

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Audio** tab located at the bottom of the **Config** tab.



Config — Audio Tab

5. Enable the embedding of each audio group by selecting the associated **Enable** check box.

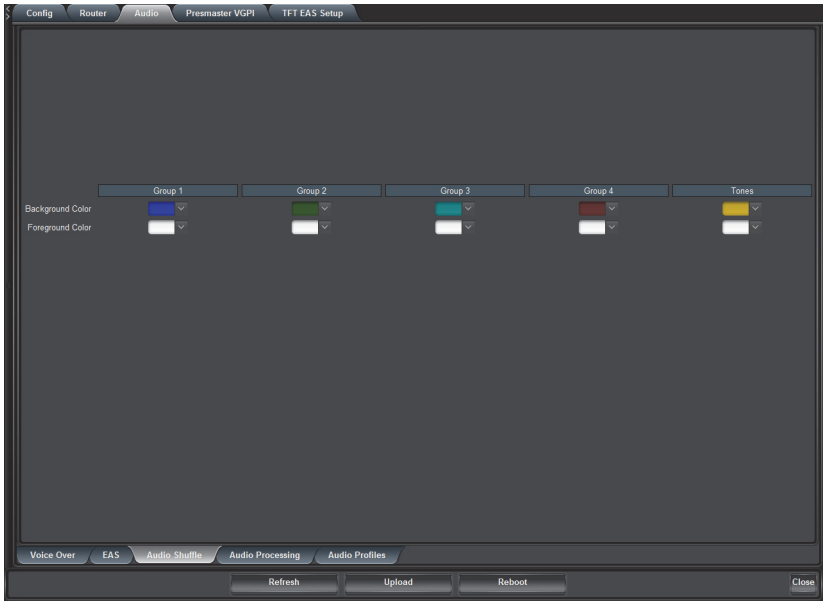
Audio Shuffling

The MC1-MK provides the ability to change the color scheme of the audio group buttons in the On Air Control interface. This allows you to assign a unique color to each group, allowing you to quickly identify the groups on the interface.

Operating Tip — *The settings on the Audio Shuffle tab are included when saving audio profiles.*

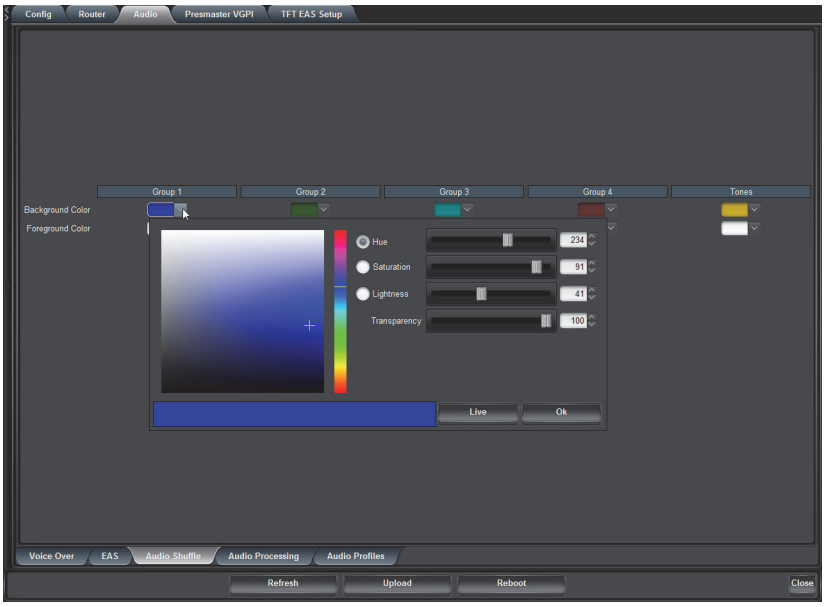
To map the audio channels

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Audio** tab.
4. Select the **Audio Shuffle** tab located at the bottom of the **Audio** tab.



Audio — Audio Shuffle Tab

5. To change the color of an audio group button on the **On Air Control** interface:
   - Select the associated **Background Color** menu for the audio group button you want to configure. The **Audio Group Button Color** dialog displays.



Audio Shuffle Tab — Audio Group Button Color Dialog

- Specify a color for the button.
- Click **Live** to preview the color scheme and apply it but not close the dialog or **OK** to apply the new color scheme and close the dialog.

6. To change the color of an audio group button on the **On Air Control** interface:

- Select the associated **Foreground Color** menu for the audio group button you want to configure. The **Audio Group Button Text Color** dialog displays.
- Specify a color for the button text.
- Click **Live** to preview the color scheme and apply it but not close the dialog or **OK** to apply the new color scheme and close the dialog.

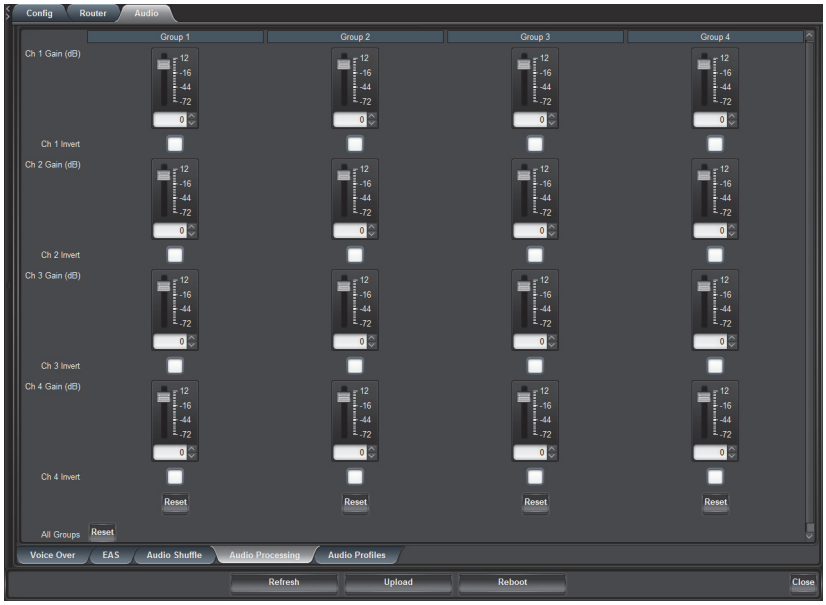
Audio Processing

The MC1-MK provides the ability to adjust the gain of each of the 16 embedded channels. You can also choose to sum every adjacent pair of audio groups with the first channel on the Odd Channel numbers (e.g. Channels 1 and 2, 3 and 4, 5 and 6 etc.).

Operating Tip — *The settings on the Audio Processing tab are included when saving audio profiles.*

To configure the audio proc amps

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Audio** tab.
4. Select the **Audio Processing** tab located at the bottom of the **Audio** tab.



Audio — Audio Processing Tab

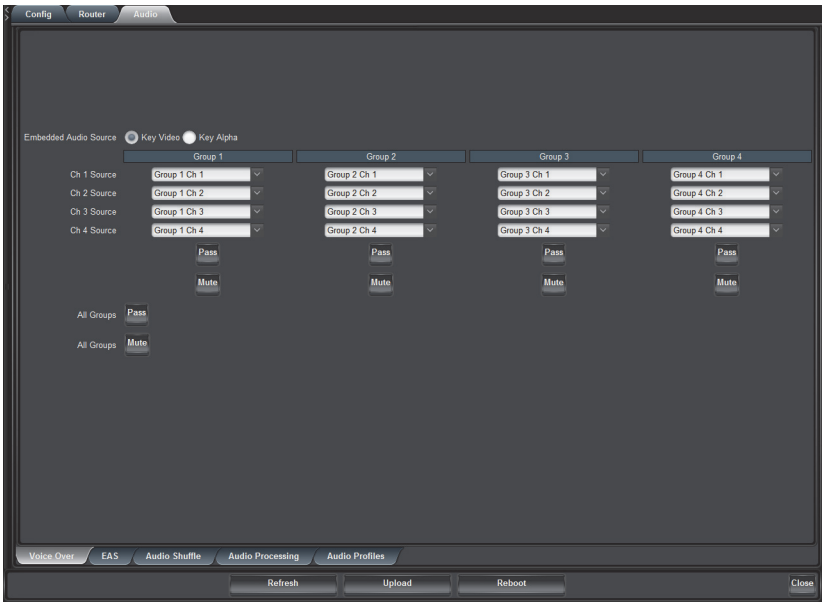
5. To apply a gain to a channel, use the associated **Ch #** slider to select a value between -72dB and +12dB.
6. To invert a channel, select the associated **Ch # Invert** box.
7. To reset the gain and invert values for a group, select the associated **Reset** button.
8. If required, repeat steps 5. to 6. for each channel in the group.

Voice Over Setup

This section outlines how to configure the embedded audio sources for the Voice Over feature for audio transitions.

To set up the voice over source

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Audio** tab.
3. Select the **Voice Over** tab located at the bottom of the **Audio** tab.



Audio — Voice Over Tab

4. Use the options in the **Embedded Audio Source** area to specify which video source the embedded audio will be used for the voice over.
5. To map a channel:
   - From the associated **Ch # Source** menu, select an audio source to include in the voice over output.
   - Note that if the selected source is not present on the input video, silence is embedded.
6. To reset the settings of a group to pass the input channels to the output channels in a direct 1:1 configuration, click **Pass** for the specific group.
7. To mute a group, click **Mute** for the specified group. Note that this overrides the gain setting for the group.
8. To pass all groups, click **Pass** in the **All Groups** area.
9. To mute all groups, click **Mute** in the **All Groups** area.
10. Repeat steps 5. to 7. for each group/channel pair you wish to configure.

Setting up the Audio for EAS

You must first setup communications between your EAS device and the MC1-MK.

For More Information on...

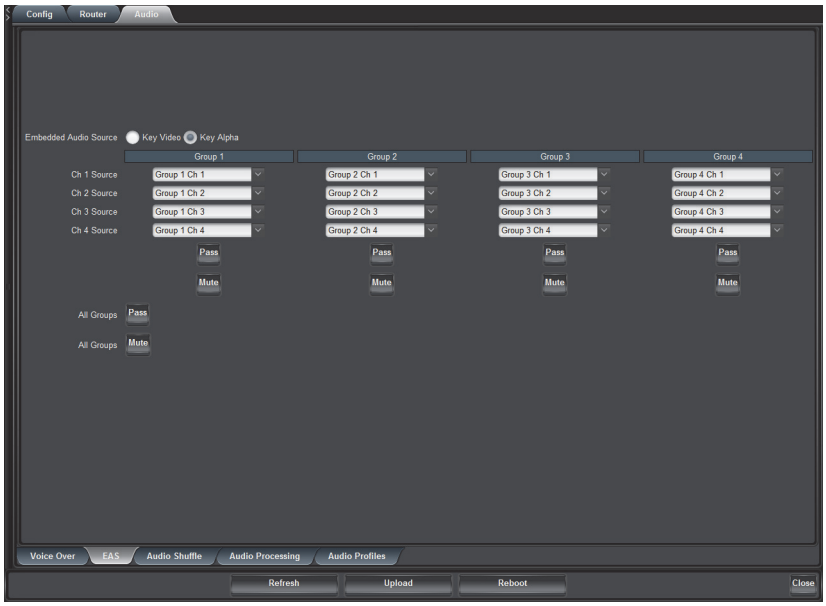
- setting up an EAS with the MC1-MK, refer to the MC1-MK setup sheet for your device. This setup sheet is available on the ***MC1-MK Documentation Resources CD*** that accompanied your MC1-MK.
- the **TFT EAS Setup** tab, refer to **Table 8.23** on page 8-26.
- the **Sage EAS Setup** tab, refer to **Table 8.24** on page 8-28.

Configuring the Audio Source for EAS

This section outlines how to configure the embedded audio sources for the EAS audio transitions.

To set up an EAS source

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Audio** tab.
3. Select the **EAS** tab located at the bottom of the **Audio** tab.



Audio — EAS Tab

4. Use the options in the **Embedded Audio Source** area to specify which video source the embedded audio will be used for the EAS.
5. To map a channel:
   - From the associated **Ch # Source** menu, select an audio source to include in the EAS output.
   - Note that if the selected source is not present on the input video, silence is embedded.
6. To reset the settings of a group to pass the input channels to the output channels in a direct 1:1 configuration, click **Pass** for the specific group.

7. To mute a group, click **Mute** for the specified group.
8. To pass all groups, click **Pass** in the **All Groups** area.
9. To mute all groups, click **Mute** in the **All Groups** area.
10. Repeat steps 5. to 7. for each group/channel pair you wish to configure for the SDI input.

Setting the EAS Duck and Gain Levels

The MC1-MK supports two types of EAS devices: TFT EAS-911 and SAGE EAS. However, only one of the two available types can be selected at a time and the selected device includes an EAS Setup tab in the Device View of DashBoard.

This section outlines the option to specify how much the Program bus audio level is reduced when an EAS alert is active. Note that if both Voice Over and EAS audio are in effect, the incoming audio is ducked twice.

To set the EAS duck level

1. Ensure that you have configured a port on the MC1-MK rear module for the EAS protocol you are using.
2. From the **Tree View**, expand the node for the MC1-MK you want to access.
3. Select the **Configuration** node to display the interface in the right-half of DashBoard.
4. Select the **Config** tab.
5. Select the **EAS Setup** tab for your device.

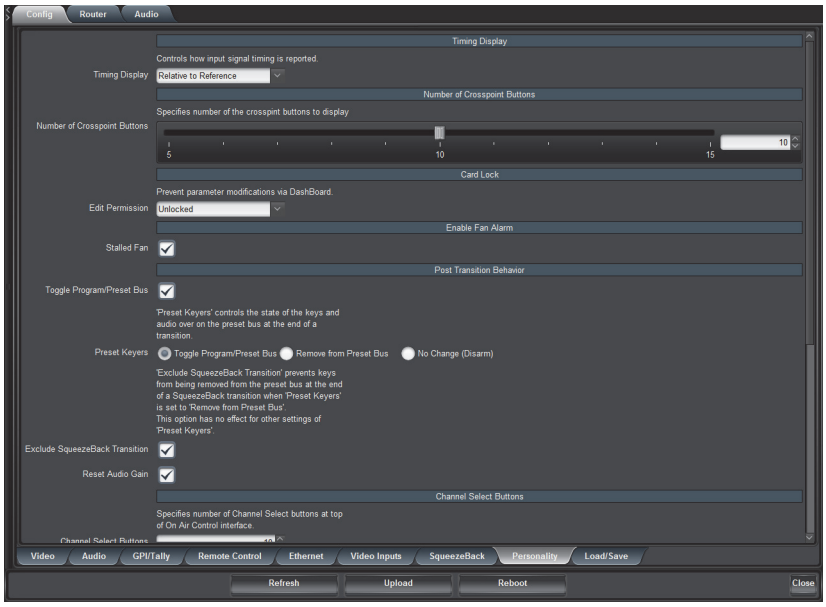
   If the **EAS Setup** tab for your device is unavailable, verify that you have correctly installed your EAS device and it is communicating with the MC1-MK.
6. Use the **EAS Duck Level** slider to specify the amount (dB) to reduce the audio level on the Program bus during an EAS alert.

Resetting the Audio Gain Level During Transitions

An option in the **Personality** tab enables you to specify whether the audio gain level is reset, to the factory default value of 0dB during transition. When enabled, this option ramps the audio gain level to the default level as the Preview bus is transitioned. When disabled, this option keeps the audio gain level at the current level after the transition completes (the audio gain is not adjusted).

To reset the audio gain level after a transition

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Config** tab.
4. Select the **Personality** tab located at the bottom of the **Config** tab.



Config — Personality Tab

5. Select the **Reset Audio Gain** box to reset the audio gain level after a transition.

Creating an Audio Profile

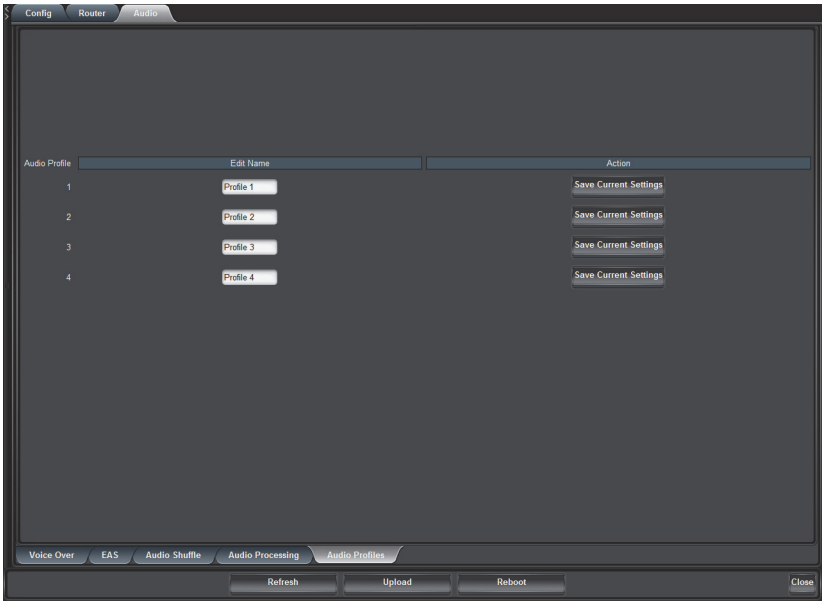
From the Audio tab in the Configuration interface you can create up to four user defined audio profiles. A profile captures all the audio settings, except the Voice Over or EAS settings, currently in use. Each profile displays as a selectable button on the **Audio Processing** tab and **Audio Shuffle** tab of the On Air Control interface.

For More Information on...

- recalling audio profiles, refer to the ***MC1-MK Operation Manual***.

To create an audio profile

1. Specify which audio group is embedded for output as outlined in the section "**Specifying Embedded Audio Groups**" on page 5-4.
2. Re-map your audio channels as outlined in the section "**Audio Shuffling**" on page 5-5.
3. If required, adjust the gain for your audio channels as outlined the section "**Audio Processing**" on page 5-7.
4. Select the **Audio Profiles** tab in the main **Audio** tab.



Audio — Audio Profiles Tab

5. In the **Edit Name** field for the audio profile, type a unique identifier for your profile. This becomes the button label on the **Audio Processing** tab and **Audio Shuffle** tab of the On Air Control interface.
6. Click the **Save Current Settings** button to save your settings.

Configuring the Text Overlay

In This Chapter

The text overlay feature of the MC1-MK is capable of displaying one layer of text in real time that contains EAS text crawls. This chapter provides a summary of using the text overlay feature of the MC1-MK. Refer to the Setup Sheet for your EAS device for information on installing and configuring your device to communicate with the MC1-MK.

The following topics are discussed:

- Customizing the EAS Text Overlay

Customizing the EAS Text Overlay

The MC1-MK provides an overlay engine that is capable of displaying an EAS horizontal text crawl in real time. EAS messages are grouped into categories in the **EAS Setup** tab as determined by the EAS device you are using. The **EAS Setup** tab provides options for customizing the appearance of each message category such as font size and color, background color, and pan speed. Refer to the ***FCC's EAS regulations at 47 C.F.R. Part 11*** for more information on message categories.

The overlay is automatically loaded into Logo 4 and associated with Keyer 4 of the MC1-MK, therefore do not use Logo 4 and Keyer 4 for any other purpose when EAS is enabled.

- Leave Logo 4 assigned to Keyer 4 to ensure that EAS text crawls output properly.
- Ensure that the **Included in Squeeze** menu is not set to **After Key 4**.

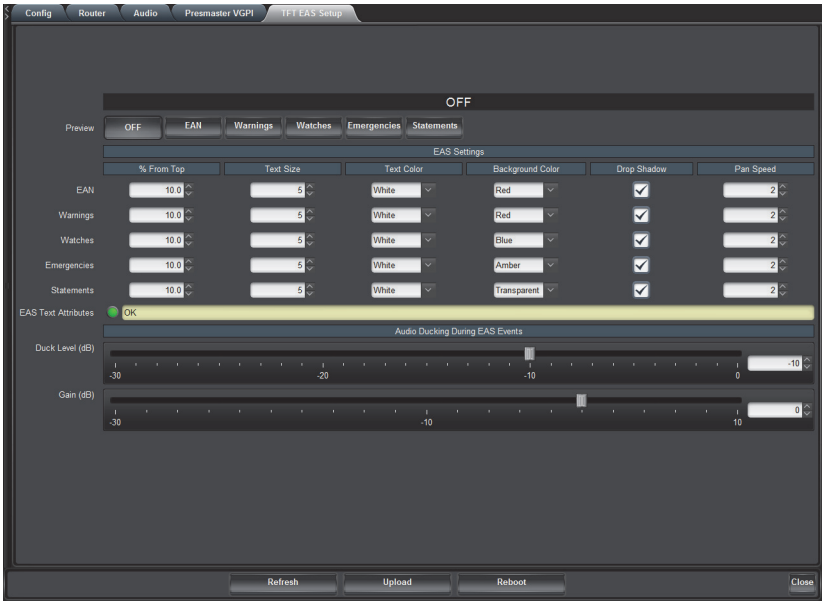
Note — *The settings in the EAS Setup tab are not restored using DataSafe, nor when porting configuration data from a setup file or another card. These settings are also not affected when you load the factory default values.*

For More Information on...

- setting up an EAS with the MC1-MK, refer to the MC1-MK setup sheet for your device. This setup sheet is available on the ***MC1-MK Documentation Resources CD*** that accompanied your MC1-MK.
- the **TFT EAS Setup** tab, refer to **Table 8.23** on page 8-26.
- the **Sage EAS Setup** tab, refer to **Table 8.24** on page 8-28.

To customize the EAS text overlay

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **EAS Setup** tab for your device. If the EAS Setup tab is unavailable, verify that you have correctly installed your EAS device and it is communicating with the MC1-MK.



EAS Setup Tab — TFT EAS

4. From the **Preview** area, select the type of event message you want to customize. The following will occur once you select a category button:
   - The **EAS Setup** tab settings display the stored values for the selected category.
   - A test EAS message automatically displays on the Preset bus (the **Key 4** button is now lit on the Preset bus). This enables you to verify your changes to the EAS text overlay.
5. Use the **Top Row** slider to adjust the vertical position of the EAS text overlay. Note that this setting is not applicable to the Emergency Alert (High Priority) categories as these messages are fixed to the top of the screen.
6. Use the **Text Size** slider to adjust the font size of the text overlay from smallest (1) to largest (10). Note that actual text size is dependent on the video format.
7. Select a text color and/or background color for the text overlay using the provided fields. The **EAS Text Attributes** field reports an error when the text color and the background color match.

Note — *When using very long EAS messages, the MC1-MK may use a smaller font size and/or may disable transparency. The exact length depends on the characters used in the message (widths of each font character).*

8. To apply a drop shadow to the text overlay, select the **Drop Shadow** box.
9. Use the **Pan Speed** slider to specify the speed of the EAS text crawl across the screen.
10. Use the **Repeat Count**
11. Repeat step 4. to step 10. for each message category you want to configure.
12. Select **Off** from the **Preview** to disable the EAS text crawl. The Preset bus no longer displays a test EAS message, and the **Key 4** button (on the Preset bus) is no longer lit.

Stand-alone MC1-MK

In This Chapter

The MC1-MK card can be used without an NK router for stand-alone applications. This chapter briefly outlines the extra steps required to setup an MC1-MK card.

The following topics are discussed:

- Overview
- System Integration
- Setup
- Source Mapping

Overview

The MC1-MK is available without a routing matrix while still providing access to four live inputs on the card to be used as sources to switch between, and access to the four internal logo channels. The stand-alone MC1-MK can be used for any combination of the following:

- Stand-alone branding and logo insertion
- Stand-alone Emergency A/B mixing
- Stand-alone EAS insertion
- Stand-alone SqueezeBack
- Stand-alone audio/voice over mixing

Stand-alone branding and logo insertion

Four downstream keyers offer the flexibility to add multiple layers of animated logo insertion and branding. Branding content is brought to air from the on-board internal media store and the external key and fill inputs for external graphic support.

Stand-alone Emergency A/B mixing

The MC1-MK supports embedding Emergency Alert (EAS) audio.

Stand-alone EAS insertion

The MC1-MK provides an overlay engine that is capable of displaying an EAS horizontal text crawl in real time. By default, the overlay is automatically loaded into Logo 4 and associated with Keyer 4 of the MC1-MK.

Stand-alone SqueezeBack

You can still perform smooth on-air SqueezeBack transitions to reveal another source or graphic, and transition to pre-squeezed effects with standard transitions.

Stand-alone audio/voice over mixing

Flexible audio/voice over mixing is provided with a variable program audio duck level, audio over gain control, and preset mixing with transition control.

System Integration

This section provides a system diagram that illustrates one way to integrate your MC1-MK into a Master Control System when not using a router. Please note that this is only an example and your facility needs may differ from what is presented here.

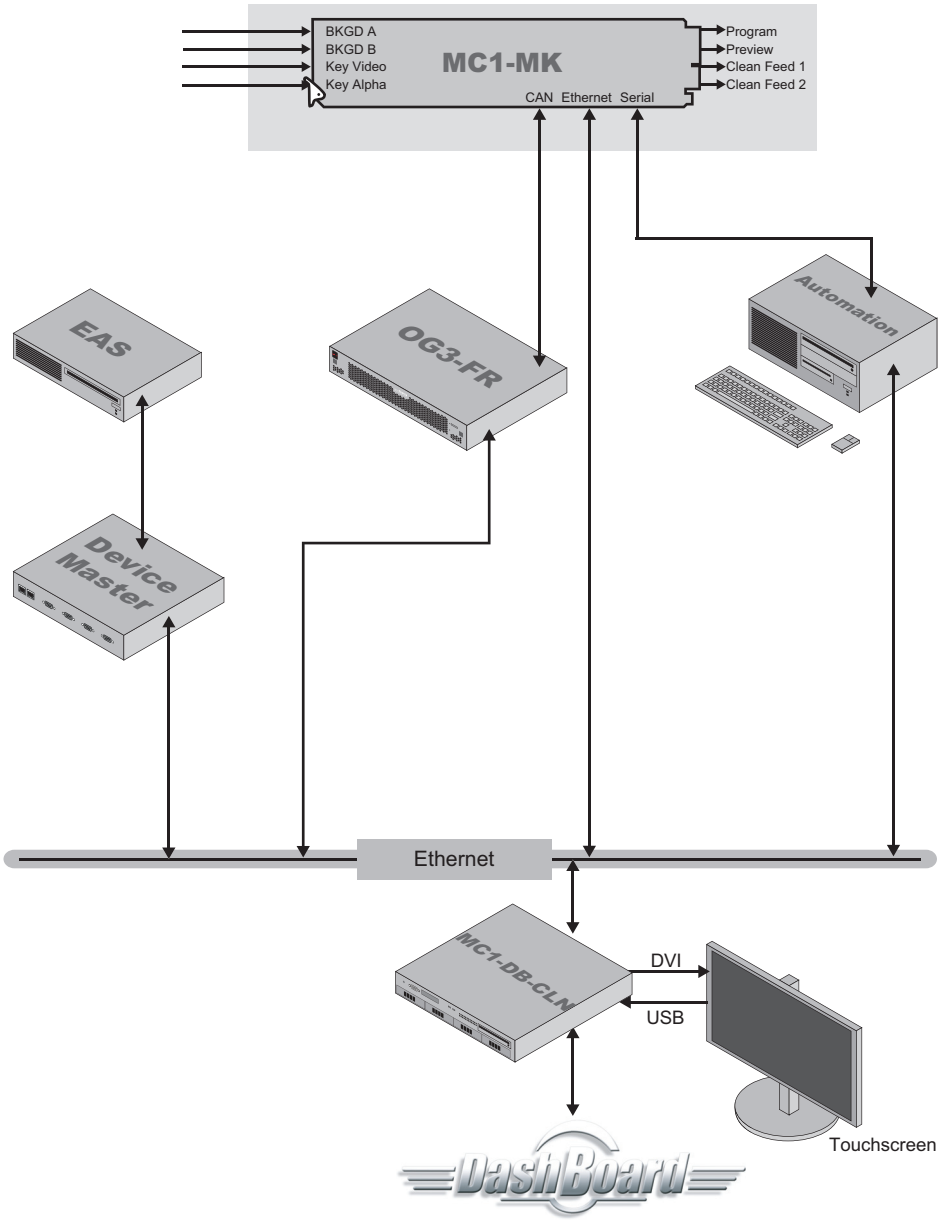


***Figure 7.1** Stand-Alone MC1-MK*

Setup

The stand-alone MC1-MK is cabled much like described in the chapter "**Physical Installation**" on page 2-1 except for the inputs.

Input Cabling

Connect your MC1-MK input video signals as illustrated in **Figure 7.2**. Ross Video does not supply these cables.

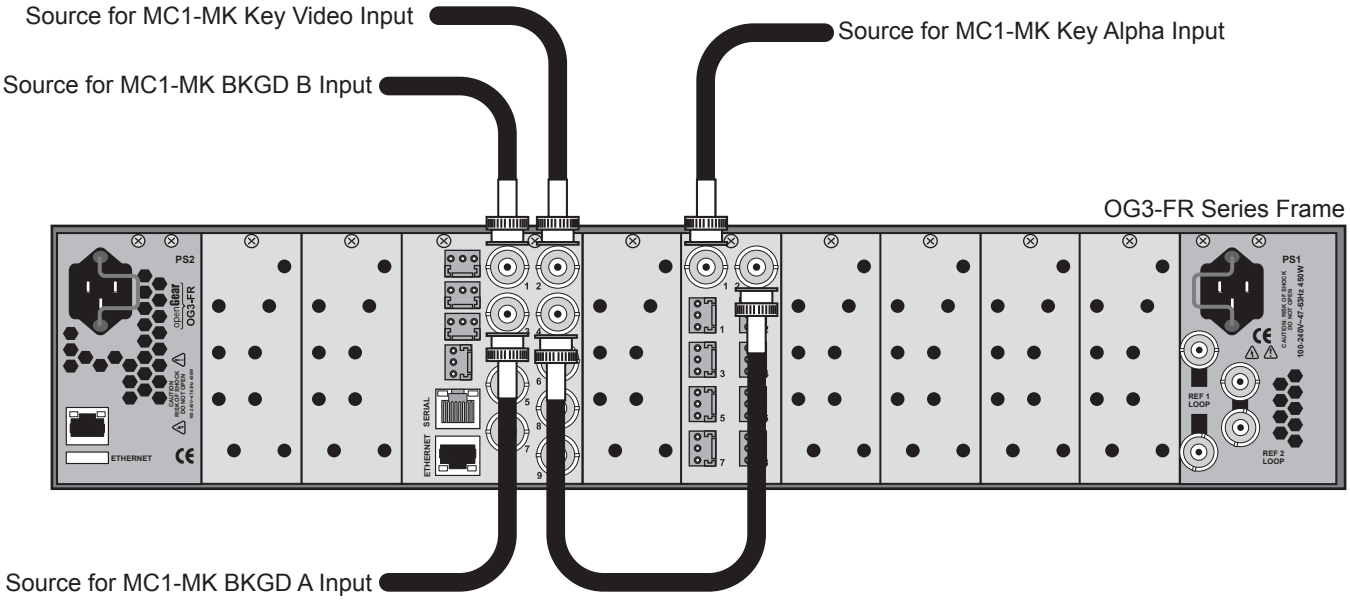

Source for MC1-MK Key Video Input
Source for MC1-MK Key Alpha Input
Source for MC1-MK BKGD B Input
OG3-FR Series Frame
Source for MC1-MK BKGD A Input

***Figure 7.2** openGear Frame Cabling — Inputs*

Communications Setup

Before proceeding, ensure that the MC1-MK is setup for communication without a router.

To specify the stand-alone setup for MC1-MK

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Remote Control** tab located at the bottom of the **Config** tab.
4. Locate the **NK Router** row in the **Ethernet Port** area of the tab.
5. Verify that its associated **Enabled** box is clear (unchecked).

Source Mapping

Next you will map your sources to the crosspoint buttons on the MC1-MK On Air Control interface using the options in the **Video Inputs** tab. Each crosspoint button can have two inputs assigned: the video source and an optional alpha source. The alpha source is used only when selecting an external key.

Output Mapping

This section enables you to disable the router output mapping for the MC1-MK. Refer to the section "**Video Connections**" on page 2-9 for output cabling details.

To disable the default router output mapping

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Video Inputs** tab located at the bottom of the **Config** tab.
4. For each of the four SDI signals, enter zero (0) in the **Router Output** field. This disables the router functionality.

Crosspoint Mapping

The MC1-MK is shipped with a factory default mapping using the available router sources to the crosspoint buttons on the DashBoard control panel. When configuring a stand-alone MC1-MK, you must change the default sources assigned to the crosspoints of the MC1-MK.

To change the crosspoint map for the MC1-MK

1. From the **Tree View**, expand the node for the MC1-MK you want to access.
2. Select the **Configuration** node to display the interface in the right-half of DashBoard.
3. Select the **Video Inputs** tab located at the bottom of the **Config** tab.
4. In the provided list, locate the crosspoint button you want to assign a video signal to.
5. Use the options in the **Type** menu to configure the crosspoint as follows:
   - **Black** — Assigns black as the source for the crosspoint button.
   - **Logo #** — Assigns the specified logo channel as the source for the crosspoint button.
   - **Logo Alpha #** — Assigns the specified logo alpha channel as the source for the crosspoint button.
   - **Bkgd A** — Assigns Background A (source connected to BNC 3 on the rear module) as the source for the crosspoint button.
   - **Bkgd B** — Assigns Background B (source connected to BNC 1 on the rear module) as the source for the crosspoint button.
6. Use the **Name** field to change the displayed name if required.
7. Repeat steps 4-6 for each crosspoint.
8. If you are using an automation system, set the Automation Switch Request feature to Button Map as outlined in the section "**Automation Switch Requests**" on page 4-9.

Appendix A. DashBoard Menus

In This Appendix

This appendix briefly summarizes the installation menus, items, and parameters available in the MC1-MK Configuration interface. Default values are noted with an asterisk (*). Some fields in the Device View vary in severity from green (valid), yellow (caution), to red (alarm). DashBoard reports the most severe alarm for a single field. Alarm colors are noted within the tables as text set in brackets next to the menu parameter name.

The following topics are discussed:

- Status Tabs
- Video Tab
- Audio Tab
- GPI/Tally Tab
- Remote Control Tab
- Ethernet Tab
- Router Tab
- Video Inputs Tab
- SqueezeBack Tab
- Personality Tab
- Load/Save Tab
- Router Tab
- Audio Tabs
- Presmaster VGPI Tab
- TFT EAS Setup Tab
- Sage EAS Setup Tab

Status Tabs

This section summarizes the read-only information displayed in the **Status** tabs.

Signal Tab

Table 8.1 summarizes the read-only information displayed in the **Signal** tab.

Table 8.1 Signal Tab Items

Tab Title	Item	Parameters	Description
Signal	Reference Status	No Reference (Red)	No signal detected on selected reference input
		Incompatible: ###	A reference signal is detected but the format is incompatible with the current output mode
		Unlocked: ###	A reference signal is detected by the card is not locked to it
		###	Indicates the reference format detected
	Bkgd A Status	### (Green)	Normal operation
		Alarm suppressed (Green)	An alarm condition exists but is silenced
		Incompatible: ### (Yellow)	Signal present but format does not match the video output format configuration of the card
		Unsupported: ### (Yellow)	Signal detected by format is not recognized
		No Signal (Red)	No signal present on the input
	Bkgd B Status	Same parameters as above	
	Key Video Status	Same parameters as above	
	Key Alpha Status	Same parameters as above	
	Bypass Relay	Normal (not in bypass) (Green)	BKGD A is available for processing, and OUT 1 is driven by the card
		Active (in bypass) (Red)	BKGD A bypasses the card and is looped passively on OUT 1 through the relay. Note BKGD A cannot be detected by the card in this state.
	Timing Display	Relative to Reference	The **Input Timing** fields display the input signal timing values relative to the selected analog reference
		Input to Output	The **Input Timing** fields display the input signal timing values relative to the SDI output of the card
	Bkgd A Timing	## Clocks ## lines	Indicates the timing of the BKGD A input signal as specified in the **Timing Display** feature
		Green	The BKGD A input signal is within the valid range
		Yellow	The BKGD A input signal is outside the valid range; a vertical shift will occur[a]
		Grey	The BKGD A input signal is not available

Table 8.1 Signal Tab Items

Tab Title	Item	Parameters	Description
Signal	Bkgd B Timing	Same parameters as above	
	Key Video Timing	Same parameters as above	
	Key Alpha Timing	Same parameters as above	
	Output Timing	## Clocks ## lines	Indicates the timing of the output signals relative to the reference
	Bkgd A Audio	1# 2# 3# 4#	Displays the audio status for each of the four audio groups where 1-4 indicates the group and # indicates the status of the group as follows: • an **s** indicates the presence of synchronous audio on the group • an **x** indicates that audio is not present • an **a** indicates the presence of asynchronous audio on the group
	Bkgd B Audio	Same parameters as above	
	Key Video Audio	Same parameters as above	
	Key Alpha Audio	Same parameters as above	

a. The inputs on the card are line-synchronized. Therefore, in order to avoid vertical shifts of the video, the input signals must be timed within approximately +/- 0.5 line.

Hardware Tab

Table 8.2 summarizes the read-only information displayed in the **Hardware** tab.

Table 8.2 Hardware Tab Items

Tab Title	Item	Parameters	Description
Hardware	HW Status	OK (Green)	Normal operation; no hardware errors and the correct rear module is installed
		Incomp I/O Module (Red)	Card is connected to the wrong rear module
	Voltage (V)	#	Measured input voltage
	Current (mA)	#	Current consumption of card in milliAmperes
	Power (W)	#	Calculated power of the card
	FPGA Temp	##C / ##F	Indicates the FPGA core temperature. A warning is displayed in DashBoard when the FPGA Core Temperature reaches 85°C. If the temperature reaches 100°C, the card will automatically shut down to avoid permanent damage and will have to be reset, rebooted, or power cycled to resume normal operation.
	FPGA Fan	# RPM (Green)	Indicates the card fan speed. If the **Stalled Fan** alarm is enabled on the Personality tab, this field reports when the card fan is not operating correctly.

Table 8.2 Hardware Tab Items

Tab Title	Item	Parameters	Description
Hardware	CPU Usage	x.xx/y.yy/z.zz	CPU Load average where: • **x.xx** represents in the last minute • **y.yy** represents the last five minutes • **z.zz** is the last fifteen minutes.
	RAM Available	#/##	CPU Memory Used / Total CPU Memory
	CF Card Status	#.## of #GB used	Displays the amount of memory used on the CompactFlash® card
		Missing	CompactFlash card is not present
		Unreadable	An error has occurred such as incompatible CompactFlash card, or an error reading the card
	Playout RAM	a / b / c / d	Displays RAM memory usage where: • **a** represents the memory in use • **b** represents the memory cache from previously loaded files • **c** represents the memory dedicated to the frame sync buffers and related functions. Note that this memory is unavailable for images and animations. • **d** represents the total playout memory

Product Tab

Table 8.3 summarizes the read-only information displayed in the **Product** tab.

Table 8.3 Product Tab Items

Tab Title	Item	Parameters	Description
Product	Product	MC1-MK or MC1-MK-4GB	
	Supplier	Ross Video Ltd.	
	Board Rev	##	Indicates the board issue
	Serial Number	######	Indicates the board serial number
	Rear Module	#	Indicates the type of Rear Module in this slot
	Software Rev	#.# build ###	Indicates the software and build versions
	Firmware Rev	##.##	Indicates the FPGA version number

Video Tab

Table 8.4 summarizes the options available in the **Video** tab. The **Video** tab is located at the bottom of the **Config** tab.

Table 8.4 Video Tab Options

Menu Title	Item	Parameters	Description
Reference Setup	Reference Input	Frame 1	Select this option to use the reference source connected to the **FRAME REF 1** port on the openGear frame.
		Frame 2	Select this option to use the reference source connected to the **FRAME REF 2** port on the openGear frame.
		Local	Select this option to use the external reference source connected to **REF IN** on the Rear Module (BNC 9). Use **J7** on the card to enable or disable a 75ohm terminator on the External Reference input. Refer to the section "**Card Overview**" on page 2-3 for information on configuring **J7**.
Output Setup	Output Format	480i 59.94	The format of the output signal of the card
		720p 59.94	
		1080i 59.94	
		576i 50	
		720p 50	
		1080i 50	
	Output 1	Program*	Assigns the source to the Program output
		Preview	Assigns the source to the Preview output
		Clean Feed #	Assigns the source to one of the Clean Feeds
	Output 2	Same parameters as above[a].	
	Output 3	Same parameters as above[b].	
	Output 4	Same parameters as above[c].	
	Dithering	Disabled*	Dithering is disabled
		Enabled - low	Dithering is enabled and set to 2bits
		Enabled - med	Dithering is enabled and set to 3bits
		Enabled - high	Dithering is enabled and set to 4bits
	Clip at Black	Selected	Enables the card to clip to SMPTE black on all outputs
		Cleared*	SuperBlack is not clipped (allows super-black)
	Clip at White	Selected	Enables the card to clip to SMPTE white on all outputs
		Cleared*	SuperWhite is not clipped (allows super-white)

Table 8.4 Video Tab Options

Menu Title	Item	Parameters	Description
Output Setup	NTSC Pass Line 21	Selected	Line 21 passes through unaltered. This setting should only be used when closed-captioning, or other data, is present on Line 21.
		Cleared*	Line 21 is treated as active video
Signal Loss Alarm	Bkgd A	Selected*	An alarm is triggered when a missing or an invalid signal is detected on the BKGD A input
		Cleared	The alarm is suppressed when a missing or an invalid signal is detected on the BKGD A input
	Bkgd B	Selected*	An alarm is triggered when a missing or an invalid signal is detected on the BKGD B input
		Cleared	The alarm is suppressed when a missing or an invalid signal is detected on the BKGD B input
	Key Video	Selected*	An alarm is triggered when a missing or an invalid signal is detected on the Key Video input source
		Cleared	The alarm is suppressed when a missing or an invalid signal is detected on the Key Video input
	Key Alpha	Selected*	An alarm is triggered when a missing or an invalid signal is detected on the Key Alpha input source
		Cleared	The alarm is suppressed when a missing or an invalid signal is detected on the Key Alpha input

a. The default value is Program.
b. The default value is Preview.
c. The default value is Clean Feed 1.

Audio Tab

Table 8.5 summarizes the audio output options in the **Audio** tab. This **Audio** tab is located at the bottom of the **Config** tab.

Table 8.5 Audio Menu Items

Menu Title	Item	Parameter	Description
Embedded Audio Output - Group #	Enable	Selected*	The specified audio group is embedded into the output
		Cleared	The specified audio group is not embedded

GPI/Tally Tab

The menu items available in the **GPI/Tally Setup** tab enable you to configure the functions, trigger, and polarity of each GPI connected to the MC1-MK. The **GPI/Tally Setup** tab is located at the bottom of the **Config** tab.

GPI Configuration

Table 8.6 summarizes the GPI menu options in the **GPI/Tally Setup** tab.

Table 8.6 GPI Setup Menu Items

Menu Title	Item	Parameter	Description
GPI #	Function	None*	The GPIO port is not configured and the GPI has no effect
		GPI Cut Key #	The key is cut on-air or off-air when this GPI input is triggered
		GPI Auto Key #	An auto transition is performed to bring the key on-air or off-air when this GPI input is triggered
		GPI Take	A take transition is performed when this GPI input is triggered.
		GPI Fade to Black	A fade to black is performed when this GPI input is triggered
		GPI EAS Audio Over	Configures the GPI port communicate with an EAS device to receive an EAS audio voice over when this GPI is triggered
		GPI Voice Over	Configures the GPI port communicate with a device to receive an audio voice over when this GPI is triggered
		GPI SqueezeBack Effect #	The specified SqueezeBack preset is performed when this GPI input is triggered
		Timecode Input	The GPIO port is used to communicate with an LTC device to input timecode. The **Trigger** and **Polarity** settings are ignored.
	Trigger	Edge*	Performs the function when a transition edge is detected on the GPI input. The Low-to-High or High-to-Low active edge is set by the Polarity control.
		Level	Performs the function when a voltage level is driven on the GPI input. The voltage level High or Low is set by the Polarity control.

Table 8.6 GPI Setup Menu Items

Menu Title	Item	Parameter	Description
GPI #	Polarity	High/Rising	Sets the polarity of the edge or level trigger. In the case of edge trigger, a Low-to-High transition starts the function. In the case of level trigger, a high level starts the function.
		Low/Falling*	Sets the polarity of the edge or level trigger. In the case of the edge trigger, a High-to-Low transition starts the function. In the case of level trigger, a low level starts the function.

Tally Configuration

The menu items available in the **GPI/Tally** tab enable you to configure each Tally.

Table 8.7 Tally Setup Menu Items

Menu Title	Item	Parameter	Description
Tally #	Function	Tally Bkgd #	Configures the GPI/O port as an output and reflects the on-air status of the specified BKGD
		Tally Key Video	Configures the GPI/O port as an output and reflects the on-air status of the Key Video
		Tally Key Alpha	Configures the GPI/O port as an output and reflects the on-air status of the Key Alpha
		Tally Key #	Configures the GPI/O port as an output and reflects the on-air status of the Key Video
		Tally Any Key	Configures the GPI/O port as an output; the tally active when any of the Keys are on-air
		Tally SqueezeBack	Configures the GPI/O port as an output; the tally is active when a SqueezeBack preset is on-air
		None*	The GPI/O port is not configured and the tally has no effect
	Trigger		This field is ignored when the port is configured as a tally. The default is Edge.
	Polarity	High/Rising	When asserted, the Tally output is driven High
		Low/Falling*	When asserted, the Tally output is driven Low

Remote Control Tab

The **Remote Control** tab enables you to set up serial and ethernet communications between the MC1-MK and external devices. Note that the default values for the Port Type, Bit Rate, Data Bits, Parity, and Stop Bits values change depending on the Protocol selected. The **Remote Control** tab is located at the bottom of the **Config** tab

Note — *A protocol can only be active on the serial port, or on the ethernet port, but not both. Should you attempt to enable the same protocol on both ports, the card automatically disables the first port (the **Enabled** box is cleared).*

Table 8.8 Remote Control Tab Items

Menu Title	Item	Parameter	Description
Serial Port[a]	Port Enabled	Selected	Enables the serial port on the Rear Module to communicate with a serial device
		Cleared*	Disables the serial port on the Rear Module
	Port Type	RS 232	Select this option if the card is connected to an external device that uses the RS-232 (TIA/EIA-232) transmission standard.
		RS 422	Select this option if the card is connected to an external device that uses the RS-422 (TIA/EIA-422) transmission standard. In this mode, the Rx receive end is terminated with a 120ohm resistor on the card.
		RS 422 unterm	Select this option if the card is connected to an external device that uses an unterminated RS-422 transmission standard. In this mode, the Rx receive end is not terminated on the card. This mode is used to daisy-chain several card Rx ports, where only the last one would be terminated. This setting is recommended when the **Protocol** is set to **Timecode**.
		RS 422 NULL	Select this option if the card is connected to an external device that uses the standard RS-422 transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the card port and the Rx receive end is terminated with a 120ohm resistor on the card.
		RS 422 NULL unterm	Select this option if the card is connected to an external device that uses the standard RS-422 unterminated transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the card port and the Rx receive end is not terminated on the card. This mode is used to daisy-chain several card Rx ports, where only the last one would be terminated.
		None*	No transmission standard is specified.

Table 8.8 Remote Control Tab Items

Menu Title	Item	Parameter	Description
Serial Port[a]	Protocol	M-2100*	This option is not fully implemented for the MC1-MK, and should not be used.
		Timecode	Select this option if you are communicating with an LTC device. Refer to the section "**Linear Timecode Setup**" on page 2-16.
		Presmaster	Select this option if the external device connected to the Serial COM port requires the Miranda™ Presmaster protocol to communicate with the MC1-MK
		TFT EAS-911	Select this option if the external device connected to the Serial COM port requires the TFT, Inc.™ EAS-911 protocol to communicate with the MC1-MK
		SAGE EAS Char Gen	Select this option if the external device connected to the Serial COM port requires the Sage EAS Generic Character Generator protocol to communicate with the MC1-MK
		RossTalk	Select this option to use the RossTalk text-based protocol that enables control of Ross Video equipment. Refer to the ***RossTalk Commands Setup Sheet*** available on the ***Gear Documentation Disc*** for details.
	Bit Rate	9600	Selects the bit rate for the external device connected to the Serial COM port
		19200	
		38400*	
		57600	
		115200	
	Data Bits	7	Sets the number of data bits transmission (character length)
		8*	
	Parity	None*	Sets the Parity type
		Even	
		Odd	
	Stop Bits	1*	Sets the number of stop bits transmission
		2	
	Flow Control	None*	Data flow is continuous between the MC1-MK and the serial device it is communicating with.
		SW	The MC1-MK notifies the serial device when it is experiencing a data overflow and to stop sending data. The MC1-MK will notify the serial device when to re-start sending data.

Table 8.8 Remote Control Tab Items

Menu Title	Item	Parameter	Description
Ethernet Port[b]	Remote Control	Inactive (Green)	**Enabled** box is not selected for this protocol
		Connected (Green)	• **Enabled** box is selected for this protocol • **Role** is set to **Client** • Specified IP address and Port number are valid • MC1-MK has successfully established connection to the given IP address and port
		Listening (Green)	• **Enabled** box is selected for this protocol • **Role** is set to **Server** • Specified Port number is valid • MC1-MK is ready to accept connections on the specified port
		Reconnecting (Yellow)	• **Enabled** box is selected for this protocol • **Role** is set to **Client** • MC1-MK attempts to connect periodically to the specified IP address and Port number. The interval between connection attempts start at 10 seconds, increases by 10 seconds, to a maximum of 60 seconds.
		Connecting (Yellow)	• **Enabled** box is selected for this protocol • **Role** is set to **Client** • MC1-MK is attempting to connect to the specified IP address and Port Number
		Port in use (Red)	• **Enabled** box is selected for this protocol • **Role** is set to **Server** • Port Number specified in the Port field is invalid or in use by another service
		Cannot connect (Red)	• **Enabled** box is selected for this protocol • **Role** is set to **Client** • Specified IP address and Port Number are invalid or in use by another device
	Enabled	Selected	Enables the specified communication protocol on the ethernet port
		Cleared*	Disables the specified communication protocol on the ethernet port. When the check box is cleared, any incoming data from the service is ignored.
	Role	Server*	MC1-MK function as a host, or socket listener, on the network
		Client	MC1-MK functions as a service requester that initiates communications with a server

Table 8.8 Remote Control Tab Items

Menu Title	Item	Parameter	Description
Ethernet Port[b]	Protocol	TCP*	Select this option if your device is connected to the card through a network and uses the Transmission Control Protocol (TCP/IP)
		UDP	Select this option if your device is connected to the card through a network and uses the User Datagram Protocol (UDP/IP).
	Port	#[c]	When **Role** is set to **Server**: • specifies the TCP or UDP port numbers where the MC1-MK will listen on. • TCP ports 0, 21, 80, 5253, and 6667 are unavailable for ethernet communications When **Role** is set to **Client**: • specifies the remote port number to which the MC1-MK will try to connect
		#	When **Role** is set to **Client**, specifies the port number of the external device
	IP Address	#.#.#.#	• Only applicable when **Role** is set to **Client** • Specifies the IP address of the external device. The default is 0.0.0.0 and this must be changed to the actual IP address of the external device

a. The default values for the Serial Port parameters, bit rate, data bits, parity, and stop bits are protocol dependent.
b. Each ethernet protocol is listed as a separate row in the Ethernet Port area of the tab.
c. The default values vary by device type.

Default Values

This section provides the default values for the Serial and Ethernet menus on the **Remote Control** tab.

Serial Port

Table 8.9 lists the default values for the Serial Port menus.

Table 8.9 Serial Port — Default Values

Protocol	Bit Rate	Data Bits	Parity	Stop Bits	Flow Control
M-2100	38400	8	None	1	None
Timecode	38400	8	None	1	None
Presmaster	38400	8	Even	1	None
TFT EAS-911	9600	8	None	1	None
SAGE EAS Char Gen	9600	8	None	1	None
RossTalk	115200	8	None	1	None

Ethernet Port

Table 8.10 lists the default values for the Ethernet Port menus.

Table 8.10 Ethernet Port — Default Values

Protocol	Enabled	Role	Protocol	Port	IP Address
M-2100	No	Server	TCP	9000	0.0.0.0
Presmaster	No	Server	TCP	9001	0.0.0.0
NK Router	No	Client	TCP	5000	0.0.0.0
TFT EAS-911	No	Client	TCP	8701	0.0.0.0
SAGE EAS Char Gen	No	Client	TCP	9002	0.0.0.0
RossTalk	No	Server	TCP	7788	0.0.0.0

Ethernet Tab

Table 8.11 summarizes the **Ethernet** options for setting up network communications for your card. The **Ethernet** tab is located at the bottom of the **Config** tab.

Table 8.11 Ethernet Tab Items

Menu Title	Item	Parameter	Description
Ethernet	Method	Static	User manually supplies the Ethernet settings. This is the recommended setting.
		DHCP	Automates the assignment of the Ethernet settings
	IP Address	###.###.###.###	The IP Address for the card
	Subnet Mask	###.###.###.###	The subnet mask for the card
	Default Gateway	###.###.###.###	The gateway for communication outside of the local area network (LAN)
	Apply Changes		Applies and saves any changes made to the **Ethernet Settings**
	Cancel		Cancels any setting changes and resets the **Ethernet Settings** to the previous values
	Ethernet Status (read-only)	OK	Ethernet communications for the card are valid
		Link Down	Ethernet communications for the card are invalid. The ethernet cable may be disconnected on the rear module or the ethernet network may be down or experiencing problems.
		No IP Address	The following conditions are occurring: • The **Method** is set to **DHCP**. • The ethernet cable connected to card rear module is connected. • A valid IP Address could not be obtained. The DHCP server may be down or is still powering up after a power outage.
		##:##:##:##:##:##	Indicates the MAC Address for the card

Video Inputs Tab

The menu items available in the **Video Inputs** tab enable you to map the video sources to crosspoint buttons on the On Air interface. The tab is divided into three areas based on function: mapping router outputs to the MC1-MK input BNCs, mapping router inputs to the crosspoint rows, and mapping router inputs to the shifted crosspoint rows. The **Video Inputs** tab is located at the bottom of the **Config** tab.

Table 8.12 Video Inputs Tab Items

Menu Title	Item	Parameter	Description
Router Output - Master Control Inputs	Bkgd A (BNC 3) Bkgd B (BNC 1) Key Vid (BNC 2) Key Alpha (BNC 4)	0*-#	• Specifies the router output source connected to the specified MC1-MK input BNC • A value of 0 means the MC1-MK will not attempt any router switches. • Positive values (1-32767) are interpreted as router inputs (either physical or virtual depending on the settings specified in the **Router** tab)
Crosspoints Button # , SHIFTED Crosspoints Button #	Type[a]	Black	Assigns Black as the source for the crosspoint button
		Router	Crosspoint source as specified by the Router Input field. The External Sources tab is now displayed in the On Air interface.
		RTR Extra #	Crosspoint source as specified by the Router Input field. However, the router input is automatically updated whenever the Automation requests a crosspoint that is not already mapped.
		Logo #	Assigns the specified logo channel as the source for the crosspoint button
		Logo Alpha #	Assigns the specified logo alpha channel as the source for the crosspoint button
		Bkgd A	Assigns Bkgd A as the source for the crosspoint button. Select when not using a router.
		Bkgd B	Assigns Bkgd B as the source for the crosspoint button. Select when not using a router.
	Router Input[b]	#	Assigns the router input source to the crosspoint button. Only applies when **Type** is set to **Router** or **RTR Extra**.
	Alpha Input	#	Assigns the router source that MC1-MK takes on the alpha input when an external Auto Select Key is selected. Only applicable when **Type** is set to **Router** or **RTR Extra**.
	Name		Use this field to enter a label for the crosspoint

a. Refer to **Table 3.1** on page 3-7 for information on the default crosspoint mapping.

b. If the Type is not set to Router, the Router Input, and Alpha Input fields are ignored. But the Name field is updated with the default value of the source selected in the Type menu (e.g. If you selected Logo 1 in the Type field, the Name field will display Logo 1).

SqueezeBack Tab

Table 8.13 summarizes the **SqueezeBack** setup options. The **SqueezeBack** tab is located at the bottom of the **Config** tab

Table 8.13 SqueezeBack Tab Items

Tab Title	Item	Parameters	Description
	Included in SqueezeBack	Background Only*	No keys are included in the SqueezeBack effect.
		After Key #[a]	The specified number of keys are scaled with the background. The default is After Key 4.

a. Refer to the section "**SqueezeBack Setup**" on page 4-4 for more information.

Personality Tab

Table 8.14 lists the available options in the **Personality** tab. The **Personality** tab is located at the bottom of the **Config** tab.

Table 8.14 Personality Tab Items

Menu Title	Item	Parameter	Description
Timing Display	Timing Display	Relative to Reference*	The **BKGD Timing**, **Key Video Timing**, and the **Key Alpha Timing** fields in the **Signal** tab displays the timing values relative to the reference: • A negative offset value indicates that the SDI signal is earlier than the analog reference. • A positive value indicates that the SDI signal is later than the analog reference.
		Input to Output	The **BKGD Timing**, **Key Video Timing**, and the **Key Alpha Timing** fields in the **Signal** tab displays the timing values relative to the output: • A negative offset value indicates that the SDI BKGD input signal is earlier than the SDI OUT signal. • A positive value indicates that the SDI BKGD input signal is later than the SDI OUT signal.
Number of Crosspoint Buttons	Number of Crosspoint Buttons	#[a]	Specifies the number of crosspoint buttons to display in each Program and Preview bus row. Applies to the On Air Control interface and the MC1-PANEL-16 (if using). The MC1-MK also sends the button number for crosspoint tallies.
Card Lock	Edit Permission	Unlocked*	All menu items are unlocked and can be edited
		Locked	All menu items, except this one, are locked and read-only. The card can still be controlled by GPI and/or external device commands if these features were enabled prior to locking.
Enable Fan Alarm	Stalled Fan	Selected*	The **FPGA Fan** field in the **Hardware** tab reports when the fan on the card surface is not operating correctly.
		Cleared	Disables this feature
Post Transition Behavior	Toggle Program/ Preset Bus	Selected*	After a transition, the Preset bus switches to the former Program bus selections
		Cleared	The Preset bus will not change after a transition. The user must manually select the next Preset source.

Table 8.14 Personality Tab Items

Menu Title	Item	Parameter	Description
Post Transition Behavior	Preset Keyers[b]	Toggle Program/Preset Bus*	Keyers will toggle between Program and Preset after a transition
		Remove from Preset Bus	After a transition, the keyers on the Preset bus will be turned off automatically. The user must manually select keyers to be included in the next transition. Select this setting to enable the Exclude SqueezeBack Transition option to take effect.
		No Change (Disarm)	The Preset Bus state does not change
	Exclude SqueezeBack Transition	Selected*	If the Disarm Preset Keyers option is enabled, selecting Exclude SqueezeBack Transition will stop keys from being disarmed at the end of a SqueezeBack transition. If the Disarm Preset Keyers option is disabled, this option has no effect.
		Cleared	Disables this feature
	Reset Audio Gain	Selected*	Audio gain will be set back to 0dB during a transition
		Cleared	Disables this feature
Channel Select Buttons	Channel Select Buttons	1-10[c]	Specifies the number of Channel Select buttons to display on the On Air Control interface for the MC1-MK.
On Air Control	Crosspoints & Keyers	Crosspoints & Keyers Shown*	Displays the entire On Air Control interface in DashBoard including the crosspoint buses and keyers.
		Crosspoints & Keyers Hidden	Displays only the Config tabs and the audio meters of the On Air Control interface in DashBoard. The crosspoint buses and keyers do not display in DashBoard.
FTB Disabling	FTB Button	FTB Enabled*	The Fade to Black (**FTB**) button functions as expected.
		FTB Disabled	The FTB button has no impact when pressed. The button is grayed out and unavailable.
Automation Switch Request	Switch Request	Router Crosspoint*	Defines switch requests as physical or virtual router crosspoints
		Button Map	Defines switch requests as a button numbers which is specified by the Video Inputs tab.
	Take Button on Panel	Take*	No change to the **TAKE** button function.
		Take Next	When the **ATMN** button is toggled to **ON** and the **Remote Control** protocol is set to **Presmaster**, this setting re-configures the **TAKE** button to send a new tally to the automation system *instead* of performing a Take transition. Refer to the section "**Pre-Roll and Take Command**" on page 10-6 for more information.

a. The default is 10.
b. The Disarm Preset Keyers option affects all Keyers unless EAS is enabled (on the Remote Control tab) in which case only Keyers 1-3 are affected.
c. The default is 2.

Load/Save Tab

The menu items available in the **Load/Save** tab enable you to reset menu parameters for the card to the factory default values. The **Load/Save** tab is located at the bottom of the **Config** tab.

Table 8.15 Load/Save Tab Items

Menu Title	Item	Parameter	Description
Global Settings	Load Factory Defaults		Resets all DashBoard parameters and values (excluding ethernet, reference, and output format settings) to the factory default values

Loading the Factory Defaults

All parameters are reset except those listed in **Table 8.16**.

Table 8.16 Excluded Parameters From a Reset

Interface	Tab	Parameter that is not reset
Configuration	Video	Reference Input
	Video	Output Format
	Ethernet	All parameters[a]
	EAS Setup	**Off** button is selected[b]
On Air	Logo #	All logo channels are set to None[c]
	Time counter	If the time counter was running before the reset, it will continue counting without resetting to 00:00:00.

a.The Ethernet Port settings in the Remote Control tab are reset to the factory default values.
b.The remaining parameters in the EAS Setup tab are not reset.
c.The logo properties (one for each image/animation) are not reset. Each image (stored on the CompactFlash™) has properties associated with it. These properties are not affected by loading the factory defaults.

Router Tab

The **Router** tab provides additional configuration options for routers. **Table 8.17** provides a summary of the options in the **Router** tab.

Table 8.17 Router Tab Items

Menu Title	Item		Parameter	Description
Router Setup	Password		#	Enter the password for the NK-IPS if this feature is enabled on your device
	Virtual		Physical*	Router references the physical connections for its crosspoints
			Virtual	Router references the virtual connections for its crosspoints
	Address		1-254*	Specifies the T-Bus address of the MC1-MK
	Delay		0-15[a]	Specifies the length of time, in frames, that the MC1-MK will wait after sending a command to the router before it assumes the router output is switched. Note that setting this value too low will result in on-air glitches.
	Router Level	L1	Selected*	Specifies the router level(s) to include for every transition the MC1-MK executes between router sources
			Cleared	
		L2-L32	Selected	
			Cleared*	

a. The default value is 3.

Audio Tabs

The **Audio** tab includes five sub-tabs that enable you to configure the Voice Over and EAS sources, set up audio shuffling, apply audio proc amps, and saving audio settings to one of four presets to recall later.

Voice Over and EAS Tabs

Table 8.18 summarizes the options for the Voice Over and EAS tabs.

Table 8.18 Voice Over and EAS Tab Items

Tab Title	Item	Parameters	Description
	Embedded Audio Source[a]	Key Video	Maps the embedded audio from the Key Video source as the audio over source
		Key Alpha	Maps the embedded audio from the Key Alpha video source as the audio over source
Group #	Ch # Source	Mute	Mutes the channel on the input
		Group # Ch#*[b]	Embeds the specified Group and Channel pair
		# Hz Tone	Embeds the selected test tone
		# kHz Tone	
	Pass		Resets the specified group settings to pass the default input channels to the output channels
	Mute		Mutes the specified group on the output
All Groups	Pass		Resets all group settings to pass the default input channels to the output channels
	Mute		Mutes all groups on the output

a. The Voice Over tab defaults to Key Video, while the EAS tab defaults to Key Alpha.
b. Default is embedded 1:1 mapping (e.g. G1C1 OUT is mapped to G1C1 IN)

Audio Shuffle Tab

Table 8.19 summarizes the options on the Audio Shuffle tab.

Table 8.19 Audio Shuffle Tab Items

Tab Title	Item	Parameters	Description
Group #	Background Color	#	Selects the display color of the buttons on the Audio Shuffle tab (in the On Air Control interface), for the specified group
	Foreground Color	#	Selects the display color of the text on the buttons of the Audio Shuffle tab (in the On Air Control interface), for the specified group

Audio Processing Tab

Table 8.20 summarizes the options on the Audio Processing tab.

Table 8.20 Audio Processing Tab Items

Tab Title	Item	Parameters	Description
Group #	Ch # Gain (dB)	-72 to +12[a]	• Adjusts the gain of the specified channel of audio • Select zero (0) when using non-PCM audio data
	Ch # Invert	Selected	Inverts the audio signal of the specified channel
		Cleared*	• Audio signal of the specified channel is not inverted • Use for non-PCM audio data
	Reset		Resets the gain value to 0 and disables the invert (box is unselected) for the specified group.
All Groups	Reset		Resets all gain values to 0 and disables the invert (boxes are unselected) for all audio groups

a. The default value is 0.

Audio Profile Tab

Table 8.21 summarizes the options on the **Audio Profile** tab.

Table 8.21 Audio Profile Tab Items

Tab Title	Item	Parameters	Description
Audio Profile #	Edit Name	#[a]	Enables you to assign a unique identifier to the selected audio profile. This name displays in the following tabs located in the On Air Control interface: • Audio Processing tab • Audio Shuffle tab
	Action	Save Current Settings	Saves the current audio shuffle and processing settings to the selected profile.

a. The first profile button name defaults to Profile 1, the second to Profile 2, the third to Profile 3, and the last button defaults to Profile 4.

Presmaster VGPI Tab

The **Presmaster VGPI** tab provides configuration options for Virtual GPIs (VGPIs) when using the Miranda™ Presmaster protocol. **Table 8.22** provides a summary of the options in the **Presmaster VGPI** tab.

For More Information on...

- the Presmaster commands that the MC1-MK supports, refer to **Table 10.1** on page 10-2.

Table 8.22 Presmaster VGPI Tab Items

Tab Title	Item	Parameters	Description
Function	VGPI #	SqueezeBack Effect 1[a]	• An ARM command (0x0130) will enable/disable SqueezeBack Preset 1 on the Preset bus • A STATE command (0x0140) will enable/disable SqueezeBack Preset 1 on the Program bus
		SqueezeBack Effect 2[b]	• An ARM command (0x0130) will enable/disable SqueezeBack Preset 2 on the Preset bus • A STATE command (0x0140) will enable/disable SqueezeBack Preset 2 on the Program bus
		SqueezeBack Effect 3[c]	• An ARM command (0x0130) will enable/disable SqueezeBack Preset 3 on the Preset bus • A STATE command (0x0140) will enable/disable SqueezeBack Preset 3 on the Program bus
		SqueezeBack Effect 4[d]	• An ARM command (0x0130) will enable/disable SqueezeBack Preset 4 on the Preset bus • A STATE command (0x0140) will enable/disable SqueezeBack Preset 4 on the Program bus

a. The default value for VGPI 0.
b. The default value for VGPI 1.
c. The default value for VGPI 2.
d. The default value for VGPI 3.

TFT EAS Setup Tab

The **TFT EAS Setup** tab enables you to customize the EAS text overlay received by your TFT EAS 911. The text overlay is automatically assigned to Logo channel 4 in Key 4, therefore do not use Logo 4 and Keyer 4 for any other purpose when EAS is enabled.

Table 8.23 TFT EAS Setup Tab Items

Menu Title	Item	Parameter	Description
	Preview	Off*	Disables the setup mode; removes test message from the PST output
		EAN	Note that if Key 4 is in use with other content, it will be re-configured. Refer to the FCC's EAS regulations at 47 C.F.R. Part 11 for more information on message categories.
		Warnings	
		Watches	
		Emergencies	
		Statements	
EAS Settings	% From Top	0-#[a]	Adjusts the vertical position of the EAS text overlay; the range depends on the video format.
	Text Size	1-10	Specifies the text size where 1 is smallest and 10 is largest. The actual text size depends on the video format. The default is 5.
	Text Color	White*	Specifies the foreground color of the text
		Red	
		Green	
		Blue	
		Amber	
		Yellow	
		Cyan	
		Black	
	Background Color	White	Specifies the background color behind the text. Each message category has a unique default value as follows: • Red — Emergency Alert and All Warnings • Blue — All Watches • Amber — All Emergencies • Transparent — All Statements
		Red	
		Green	
		Blue	
		Amber	
		Yellow	
		Cyan	
		Black	
		Transparent	

Table 8.23 TFT EAS Setup Tab Items

Menu Title	Item	Parameter	Description
EAS Settings	Drop Shadow	Selected*	Applies a visual effect that makes the text appear three-dimensional
		Cleared	Disables this feature
	Pan Speed	1 to 5	Determines how fast the EAS message scrolls across the screen (from left to right) where: 5 is the fastest speed and 1 is the slowest. The default value is dependent on the video format as follows: 1 for SD video formats, 2 for HD video formats.
	EAS Text Attributes	OK (Green)	Text color and background color do not match; text can be read on-screen
		EAN not visible (Yellow)	Text color and Background color match for EAN messages; text cannot be read on-screen
		Warnings not visible (Yellow)	Text color and Background color match for Warnings; text cannot be read on-screen
		Watches not visible (Yellow)	Text color and Background color match for Watches; text cannot be read on-screen
		Emergencies not visible (Yellow)	Text color and Background color match for Emergencies; text cannot be read on-screen
		Statements not visible (Yellow)	Text color and Background color match for Statements; text cannot be read on-screen
Audio Ducking During EAS Events[b]	EAS Duck Level (dB)	-30 to 0[c]	This gain is applied to normal input audio on the Program bus while an EAS alert is active.
	Gain (dB)	-30 to 10[d]	This adjusts the overall output gain on the Program bus while an EAS alert is active (applies to the input audio and the EAS input audio)

a. The default value is 10.0.
b. Refer to the section "**Audio Overview**" on page 5-2 for details on audio layering.
c. The default value is -10dB.
d. The default value is 0.

Sage EAS Setup Tab

The **Sage EAS Setup** tab enables you to customize the EAS text overlay received by your SAGE EAS. The text overlay is automatically assigned to Logo channel 4 in Key 4, therefore do not use Logo 4 and Keyer 4 for any other purpose when EAS is enabled.

Table 8.24 Sage EAS Setup Tab Items

Menu Title	Item	Parameter	Description
	Preview	Off*	Disables the setup mode; removes test message from the PST output
		Low Priority	Refer to the FCC's EAS regulations at 47 C.F.R. Part 11 for more information on message categories.
		Medium Priority	
		High Priority	
SAGE Generic Character Generator Settings	% From Top	0-#[a]	Adjusts the vertical position of the EAS text overlay; the range depends on the video format.
	Text Size	1-10	Specifies the text size where 1 is smallest and 10 is largest. The actual text size depends on the video format. The default is 5.
	Text Color	White*	Specifies the foreground color of the text
		Red	
		Green	
		Blue	
		Amber	
		Yellow	
		Cyan	
		Black	
	Background Color	White	Specifies the background color behind the text. Each message category has a unique default value as follows: • Red — High Priority • Yellow — Medium Priority • Green — Low Priority
		Red	
		Green	
		Blue	
		Amber	
		Yellow	
		Magenta	
		Cyan	
		Black	
	Drop Shadow	Selected*	Applies a visual effect that makes the text appear three-dimensional
		Cleared	Disables this feature

Table 8.24 Sage EAS Setup Tab Items

Menu Title	Item	Parameter	Description
SAGE Generic Character Generator Settings	Pan Speed	1 to 5	Determines how fast the EAS message scrolls across the screen (from left to right) where: 5 is the fastest speed and 1 is the slowest. The default value is dependent on the video format as follows: 1 for SD video formats, 2 for HD video formats.
	Repeat Count	1 to 10[b]	Specifies the number of times to display the entire text crawl before taking it off air
	EAS Text Attributes	OK (Green)	Text color and background color do not match; text can be read on-screen
		Low Priority not visible (Yellow)	Text color and Background color match for Low Priority messages; text cannot be read on-screen
		Medium Priority not visible (Yellow)	Text color and Background color match for Medium Priority messages; text cannot be read on-screen
		High Priority not visible (Yellow)	Text color and Background color match for High Priority messages; text cannot be read on-screen
Audio Ducking During EAS Events[c]	EAS Duck Level (dB)	-30 to 0[d]	This gain is applied to normal input audio on the Program bus while an EAS alert is active.
	Gain (dB)	-30 to 10[e]	This adjusts the overall output gain on the Program bus while an EAS alert is active (applies to the input audio and the EAS input audio)

a. The default value is 10.0.
b. The default value is 2.
c. Refer to the section "**Audio Overview**" on page 5-2 for details on audio layering.
d. The default value is -10dB.
e. The default value is 0.

Appendix B. Specifications

In This Appendix

This appendix provides information on the specifications for your MC1-MK. Note that specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications
- Communication Specifications
- Video Characteristics

Technical Specifications

This section includes the technical specifications for the MC1-MK.

Table 9.1 MC1-MK Technical Specifications

Category	Parameter		Specification
Serial Digital Video Inputs	Number of Inputs		4
	SDI Data Rates and SMPTE Standards Accommodated		SMPTE 259M (270Mbps) SMPTE 292M (1.485Gbps)
	Impedance		75ohms
	Return Loss	8320AR-033 Rear Module	SDI IN 1: 15dB to 1.485GHz SDI IN 2-4: >15dB to 1.485GHz
		8320AR-055 Rear Module	>15dB
	Equalization (using Belden 1694A cable)	8320AR-033 Rear Module	SD: 120m HD: 100m
		8320AR-055 Rear Module	SD: 300m HD: 140m
Serial Digital Video Outputs	Number of Outputs		4
	Impedance		75ohms
	Return Loss	8320AR-033 Rear Module	SDI OUT 1: 15dB to 1.485GHz SDI OUT 2-4: >15dB to 1.485GHz
		8320AR-055 Rear Module	>13dB
	Signal Level		800mV +/-10%
	DC Offset		0+/-50mV
	Rise and Fall Time	8320AR-033 Rear Module	SD: 900ps typical HD: 150ps typical
		8320AR-055 Rear Module	SD: 900ps typical HD: 150ps typical
	Overshoot		<10% typical
Cable Lengths	RS-232 Serial Interface Maximum Cable Length		10m (33ft)
	RS-422 Serial Interface Maximum Cable Length		300m (984ft)
Environment	Maximum ambient temperature		40°C (104°F)
Power	Power Consumption		22W

Communication Specifications

This section provides additional information on the different connector types of the MC1-MK rear module.

Serial COM Port

When building cables to interface to the card **Serial COM** port, it is recommended to use CAT-5 or CAT-5e cable with the standard wiring color coding.

8320AR-033 Rear Module

Table 9.2 shows the pin assignment of the **Serial COM** port located on the 8320AR-033 Rear Module.

Notice — *Pins 4 and 5 provide +12V @ 0.2A. Do not connect these pins if unused, these pins must be left unterminated (floating).*

Table 9.2 RJ-45 Pin Assignment — 8320AR-033

RJ45 Pin	RS-232	RS-422	RS-422 Null
1	n/c	Tx+	Rx+
2	Rx	Tx-	Rx-
3	Tx	Rx+	Tx+
4	+12V	+12V	+12V
5	+12V	+12V	+12V
6	n/c	Rx-	Tx-
7	GND	GND	GND
8	GND	GND	GND

8320AR-055 Rear Module

Table 9.3 shows the pin assignment of the **Serial COM** port located on the 8320AR-055 Rear Module.

Table 9.3 RJ-45 Pin Assignment — 8320AR-055

RJ45 Pin	RS-232	RS-422	RS-422 Null
1	n/c	Tx+	Rx+
2	Rx	Tx-	Rx-
3	Tx	Rx+	Tx+
4	n/c	n/c	n/c
5	n/c	n/c	n/c
6	n/c	Rx-	Tx-
7	GND	GND	GND
8	GND	GND	GND

LTC Serial Cabling Requirements

When building cables to interface to the card **Serial COM** port and an LTC device, it is recommended to use CAT-5 or CAT-5e cable with the standard ethernet wiring color coding.

8320AR-033 Rear Module

Table 9.4 shows the pin assignment of the **Serial COM** port on the 8320AR-033 Rear Module.

Table 9.4 Interface Cable for LTC Input — 8320AR-033

RJ45 Pin	RS-422 Serial COM Rx Port	LTC Signal
1	Tx+	
2	Tx-	
3	Rx+	LTC+
4	+12V	
5	+12V	
6	Rx-	LTC-
7	GND	GND
8	GND	GND

8320AR-055 Rear Module

Table 9.4 shows the pin assignment of the **Serial COM** port on the 8320AR-055 Rear Module.

Table 9.5 Interface Cable for LTC Input — 8320AR-055

RJ45 Pin	RS-422 Serial COM Rx Port	LTC Signal
1	Tx+	
2	Tx-	
3	Rx+	LTC+
4	n/c	
5	n/c	
6	Rx-	LTC-
7	GND	GND
8	GND	GND

Ethernet Port

The **Ethernet** port on the Rear Module is used to connect to an ethernet network for communications, software upgrades using DashBoard, media file management via an FTP client, and for viewing thumbnails

Note — *Contact your IT Department before connecting the card to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP Address, Subnet Mask, and Gateway for the card.*

GPIO Connections

When configured as a GPI, a port behaves as an input, and can be used to trigger actions such as Cut/Dissolve the Key and/or Background. A push-button switch, or an ON-OFF switch, may be directly connected between the port and the adjacent ground pin. Alternatively, an external device may drive a low level. Minimum pulse duration is 1ms, anything shorter will be filtered out. Typically, users will configure the GPI for Edge trigger. This means that the action is carried out either on the falling edge (button is pushed), or rising edge (button is released), depending on which Polarity is selected. Alternatively, users may configure the GPI for Level trigger. In this mode, the action is carried out on both the rising and falling edges, so there are effectively two states. The Polarity control can be used to invert the behavior. Regardless of the trigger type, GPI commands may be overridden by other command inputs such as serial protocols.

The **Edge** option enables the GPI to act as a latching trigger. Edge triggers are used when you want to toggle between settings. This option enables the GPI to execute a specific function.

- If configured for Falling Edge, the selected function is executed when the GPI input signal transitions from High to Low.
- If configured for Rising Edge, the selected function is executed when the GPI input signal transitions from Low to High.
- Edge triggered GPI signals are sampled once per frame and the associated function is executed only once per frame. The minimum pulse width is 1 millisecond.
- Typically, the edge triggered GPI is driven by external equipment that generates one pulse per event.

Level triggers are used when you want to assert a particular state for a setting. You define the on-air state of the function as being either Level High or Level Low. Therefore, if the on-air state of the Key is defined as Level High for example, when the GPI is a Level High signal, the Key will stay on air. If a Level Low is received, the Key will be taken off air.

- If configured for Active Low, the selected function is executed when the GPI input signal is driven Low.
- If configured for Active High, the selected function is executed when the GPI input signal is driven High.

Tally Connections

When configured as a Tally, a port becomes an output, providing a status indicator. Typically this is used to indicate which input(s) are on-air at any given moment. Each tally output on the card can be configured to be active when any of the four inputs are on air. They can be configured as Active High or Active Low. The Trigger type (Edge or Level) is only relevant for GPI inputs and has no effect on Tally outputs. The tally outputs defaults to a logical high level when inactive. When the tally becomes active, for example the signal is on-air, then the output is driven low.

Video Characteristics

This section provides additional information for configuring video sources.

Video Processing

Keep the following in mind when configuring your video inputs and outputs:

- The SDI output timing is fixed on the MC1-MK and is set to approximately 0.5 lines after the reference.
- Each video input has a line sync that can support a full line of SD or HD video including horizontal blanking.
- All video inputs must be timed with the reference. The input tolerance is approximately +/- 0.5 line. Exceeding this tolerance will result in the output shifting of 1 line. The **Timing** status fields in the **Signal** tab displays a Yellow indicator when operating outside the range of the line sync. In such cases, a vertical shift of 1 line or more may occur.
- All of the video inputs must be the same video format as specified in the **Video** tab for the card. If the formats do not match, the card reports an error in the DashBoard **Signal Status** area and on the card-edge LEDs.
- The Program and Preset sources can be any of the four internally generated Logo channels or external inputs, or an internally generated black.
- Each of the four outputs can be configured as Program, Preset, or one of four Clean Feeds.
- All of the outputs can be enabled to add dither, clip to SMPTE black or allow super-black, or clip to SMPTE white or allow super-white.

Output Format Reference Compatibility

Depending on the reference format you use, the card will only be able to operate in certain formats as outlined in **Table 9.6**.

Table 9.6 Output/Reference Compatibility

Reference	Output					
	480i 59.94Hz	720p 59.94Hz	1080i 59.94Hz	576i 59.94Hz	720p 50Hz	1080i 50Hz
480i 59.94Hz	✓	✓	✓			
720p 59.94Hz		✓				
1080i 59.94Hz	✓	✓	✓			
576i 59.94Hz				✓	✓	✓
720p 50Hz					✓	
1080i 50Hz				✓	✓	✓

Appendix C. Serial Protocols

In This Appendix

This appendix provides additional information on the serial communications protocols used with the MC1-MK.

The following topics are discussed:

- Miranda™ Presmaster Control System Protocol

Miranda™ Presmaster Control System Protocol

The MC1-MK supports a subset of Miranda™ Presmaster Control System automation commands and automation tallies. Ensure the **ATMN** button is toggled to **ON** to enable your automation device to control the MC1-MK. This button is located on the **On Air Control** interface.

For More Information on...

- the Miranda™ Presmaster protocol, refer to the ***Miranda Presmaster Automation Protocol Manual***
- the location of the **ATMN** button on the **On Air Control** interface, refer to the ***MC1-MK Operation Manual***.

Commands

Table 10.1 summarizes the automation commands supported by the MC1-MK.

Table 10.1 Supported Commands

Command	Code	Supported	Notes
Simple Commands			
SET_TRANS_TYPE	0x01	✓	Only transition types 01-05 are supported; transition types 06-19 are used to select the SqueezeBack transition type
ENQ_STAT	0x02	✓	Results in the return of the following tallies: current crosspoint state on the Program and Preset buses, voice over states, and the current transition type. The following tallies are not returned: DSK states, transition rate, auxiliary bus source.
SET_TRANS_RATE	0x03	✓	• Sets the transition rate in frames. • Range is between 1 and 99 inclusive. • Default rate is set to 60 frames. • Upon setting a rate a tally is also sent.
SET_DSK1_STATE	0x06		
SET_DSK2_STATE	0x07		
SET_PRG_VID_SRC	0x09	✓	Refer to the section "**Automation Switch Request**" on page 10-4.
SET_PRG_AUD_SRC	0x0A		Audio follows video
SET_PRESET_VID_SRC	0x0B	✓	Refer to the section "**Automation Switch Request**" on page 10-4
SET_PRESET_AUD_SRC	0x0C		Audio follows video
SET_AUX_VID_SRC	0x0D	✓	Refer to the section "**Automation Switch Request**" on page 10-4
SET_AUX_AUD_SRC	0x0E		Audio follows video
TAKE_ALL	0x0F	✓	
TAKE_AUDIO	0x10		
AO_STATE	0x13		
AO_SRC	0x14		
SRC_TABLE_SET	0x1A		
MIXER_POLL	0x1E	✓	Always returns 0xFF 0x1E
AO_LEVEL	0x24		

Table 10.1 Supported Commands

Command	Code	Supported	Notes
PRG_LEVEL	0x25		
SRC_CHN_LEVEL	0x26		
DSK_CLIP_LEVEL	0x27		
DSK_GAIN_LEVEL	0x28		
SRC_GAIN	0x29		
SET_AUTO_STATE	0x2B		
START_AUDIO_LEAD	0x2C		Audio leading fixed at 1 frame
ABORT_AUDIO_LEAD	0x2E		
START_AUDIO_LAG	0x2F		
ABORT_AUDIO_LAG	0x31		
DSK1_SETTING	0x32		
DSK2_SETTING	0x33		
SET_AUDIO_MODE	0x34	✓	• Supports 4 pairs, plus mute and phase inversion • Select from any of the 8 possible input pairs (and of the 16 embedded channels) • Mute bits apply to both channels of an audio pair • Phase Reverse bits apply to the second channel of the pair only • Crosspoint selection applies to either a crosspoint number or to a router input, as defined by the Automation Switch Request. Refer to the section "**Automation Switch Request**" on page 10-4. › When using a router input, the Audio Mode applies to all crosspoints mapped to the specified router input. › When the specified router input is not mapped to any crosspoint, the command is ignored. • Takes effect the next time the specified crosspoint is selected on a TAKE or hot-punch transition.
SET_AO_RATE	0x38		
SET_U_FADE_TIMES	0x3C		
Extended Commands			
IS2_TUNNEL	0x0001		
TAKE_VIDEO	0x0010		Video and audio are switched together.
DSK_ARM	0x0006	✓	
DSK_STATE	0x0007	✓	• Enables you to activate/deactivate a specified key using a fade or a cut transition on the Program bus. • The transition rate used will always be determined by the automation rate, as specified by the Simple Command 0x03.
LOAD_PREV_IMG	0x0032		
LOAD_IMG	0x0033	✓	Load file into specified DSK. DSK 0 to 3 load specified file into DDR for Logo 1 to 4 respectively. DSK 127 (7Fh) pre-loads file into the DDR only for fast recall into usable Logo 1 to 4, when needed. A tally is sent regardless of the outcome. The expected tally is now returned if the file is already loaded. On a failure to load a file, a tally is returned with a zero-length filename.
VO_ARM	0x0013	✓	Arms the voice over state on the Preset bus for the next Take All command. Only VO number 0 is supported.

Table 10.1 Supported Commands

Command	Code	Supported	Notes
VO_STATE	0x0014	✓	Immediately sets the voice over state on the Program bus. Only VO number 0 is supported. Avoid using VO number 1 as it is reserved for EAS audio (voice) over.
VO_PRESET	0x0024	✓	Sets the voice over preset level. Expressed in 1/10 dB steps with unity at 0x0800. The allowable range is -30 (0x06D4) to +10 (0x0864). VO number 0 is the ON AIR Voice Over Gain and VO number 1 is the EAS gain.
VO_DUCK	0x0025	✓	Sets the voice over duck level. Expressed in Expressed in 1/10 dB steps with unity at 0x0800. The allowable range is -30 (0x06D4) to 0 (0x0800). VO number 0 is the ON AIR Voice Over ducking, and VO number 1 is the EAS ducking.
ENQ_DSK_IMG	0x0034	✓	Inquire DSK image exists; causes return of four tallies (one for each logo). Includes a tally for DSK 127.
VO_RATE	0x0038		
VO_SHUFFLE	0x0026		
VGPI_ARM[a]	0x0130	✓	• Supports a maximum of four VGPIs (VGPI 0 to VGPI 3) • This command will be ignored when the specified SqueezeBack Preset is on Program • When in Arm Up state, the command includes the specified SqueezeBack Preset in the transition (the **INCL SQUEEZE** button is lit on the On Air Control interface) • When in Arm down/Disarm state, the command excludes the specified SqueezeBack Preset in the transition (**INCL SQUEEZE** button is unlit on the On Air Control interface)
VGPI_STATE[a]	0x0140		• When no SqueezeBack Preset is on Program and this command is in the Up state, selects the effect type of VGPI and transitions the selected effect on Program. • When a SqueezeBack Preset is on Program and this command is in the Down state, the VGPI which has the same effect as the current one will be handled and the current effect will be off air or on Preview. • In other cases, the command will be ignored.
SET_PCS_CHN	0x0040		
GET_PCS_CHN	0x0041		
AUTO_TALLY_ENA	0x0042		
SET_PAN_SHOTBOX	0x0043		
GET_PAN_SHOTBOX	0x0044		
CHECK_MEDIA	0x0047		
DISCONN_PAN	0x0048		

a. The Presmaster protocol must be enabled on the Remote Control tab in DashBoard. Refer to the section "**Using the Presmaster Protocol for VGPIs**" on page 4-14 for details.

Automation Switch Request

The Automation Switch Request feature uses Simple Commands 0x09, 0x0B, and 0x0D and is applicable when operating with an Automation system. This feature defines the crosspoint switch as a router crosspoint number or as an MC1-MK button map number.

In order to access button 20, an extended message must be provided as specified in the Presmaster protocol specification. For example, `FF 09 7F 00 14` would be sent for the Program bus.

Ensure that the Switch Request feature in the **Personality** tab is set as required for your setup. Refer to the section "**Automation Switch Requests**" on page 4-9 for details.

Tallies

Table 10.2 summarizes the automation tallies supported by the MC1-MK.

Table 10.2 Supported Presmaster Tallies

Name	Tally ID	Supported	Notes	Included in ENQ_STAT (0x02)
Program Video Source	49	✓	Refer to the section "**Automation Switch Request**" on page 10-4	✓
Program Audio Source	4A	✓	Audio follows video	✓
Preset Video Source	4B	✓	Refer to the section "**Automation Switch Request**" on page 10-4	✓
Preset Audio Source	4C	✓	Audio follows video	✓
Aux Video Source	4D	✓	Refer to the section "**Automation Switch Request**" on page 10-4	✓
Aux Audio Source	4E		Audio follows video	
Take Complete	4F	✓		
Take Audio	50			
V/O State	53	✓	Sent on change in voice over state	✓
U-Fade Rate	7C			
Transition Type	41	✓		✓
Transition Rate	43	✓		✓
Mixer Poll	5E	✓	Always returns 0xFF, 0x5E	
Source Audio Parameters	6E			
DSK Clip Value	67			
DSK Gain	68			
DSK State	Ext 0x0806			
VO Arm State	Ext 0x0813	✓		✓
VO Parameters	Ext 0x0826			
Image Load State	Ext 0x0833	✓	Sent whenever a new image file has loaded, via automation or otherwise. Reports DSK 0 to 3 when loaded file into DDR for Logo 1 to 4, respectively. Reports DSK 127 (7Fh) when file is pre-loaded into DDR only (this can only originate via automation).	
DSK Image Existence	Ext 0x0834	✓	Response to the "ENQ_DSK_IMG" command. Includes DSK 0 to 3, Logo 1 to 4 respectively, a flag byte set if specified file is loaded on the corresponding logo and the filename.	
Current VGPI State	Ext 0x0940	✓		

Table 10.2 Supported Presmaster Tallies

Name	Tally ID	Supported	Notes	Included in ENQ_STAT (0x02)
Set Panel to Channel on PCS	Ext 0x0840			
Get Which Channel a Panel is connected to	Ext 0x0841			
Automation Control Status	Ext 0x0842			
Current Shot Box Selected on Panel	Ext 0x0843			
Tally Sent when a Panel Acquires a Channel	Ext 0x0845			
Tally Sent when a Panel Drops a Channel	Ext 0x0846			
Tally Sent Back from Intuition to Show which Files, if any, are Missing in a Template	Ext 0x0847			
Automation Assist Command	Ext 0x0928			

Pre-Roll and Take Command

Table 10.3 outlines the additional tallies available when the **Take Button on Panel** setting in the **Personality** tab is set to **Take Next**.

Table 10.3 Additional Tallies

Name	Tally	Notes
Automation Disabled	FF 6B 01 00	Sent when the operator disables automation using the ATMN button on the MC1-MK interfaces.
Automation Enabled	FF 6B 01 01	Sent when the operator enables automation using the ATMN button on the MC1-MK interfaces.
Take Next Released	FF 6B 03 00	Sent on completion of a TAKE operation and after the “Take Next Asserted” tally. Automation must be enabled on the MC1-MK.
Take Next Asserted	FF 6B 03 01	Sent when the operator presses the TAKE button on the On Air Control interface, or MC1-PANEL-16 control panel. Automation must be enabled on the MC1-MK.

Appendix D. Software Licenses

In This Appendix

This appendix provides third-party software license information for your MC1-MK card. This product includes multiple software components which are individually licensed under one or more of the following licenses included in this appendix.

This appendix contains the following sections:

- BSD
- Dual GPL/Free Type
- GPL
- IJG
- LGPL
- MIT
- zlib

BSD

Copyright (c) 1991,1993, The Regents of the University of California. All rights reserved.
This code is derived from software contributed to Berkeley by Kenneth Almquist.
Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:
1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. <BSD Advertising Clause omitted per the July 22, 1999 licensing change ftp://ftp.cs.berkeley.edu/pub/4bsd/README.Impt.License.Change> California, Berkeley and its contributors.
4. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.
THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Dual GPL/Free Type

Portions of this software are copyright (C) 1996-2002 The FreeType Project (www.freetype.org). All rights reserved.
This project is also covered under the GPL v2.

GPL

GNU GENERAL PUBLIC LICENSE
Version 3, 29 June 2007
Copyright (C) 2007 Free Software Foundation, Inc. <http://fsf.org/>
Preamble

The GNU General Public License is a free, copyleft license for software and other kinds of works.

The licenses for most software and other practical works are designed to take away your freedom to share and change the works. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change all versions of a program--to make sure it remains free software for all its users. We, the Free Software Foundation, use the GNU General Public License for most of our software; it applies also to any other work released this way by its authors. You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for them if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs, and that you know you can do these things.

To protect your rights, we need to prevent others from denying you these rights or asking you to surrender the rights. Therefore, you have certain responsibilities if you distribute copies of the software, or if you modify it: responsibilities to respect the freedom of others.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must pass on to the recipients the same freedoms that you received. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

Developers that use the GNU GPL protect your rights with two steps: (1) assert copyright on the software, and (2) offer you this License giving you legal permission to copy, distribute and/or modify it.

For the developers' and authors' protection, the GPL clearly explains that there is no warranty for this free software. For both users' and authors' sake, the GPLrequires that modified versions be marked as changed, so that their problems will not be attributed erroneously to authors of previous versions.

Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.

Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS

0. Definitions.

"This License" refers to version 3 of the GNU General Public License.

"Copyright" also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

"The Program" refers to any copyrightable work licensed under this License. Each licensee is addressed as "you". "Licensees" and "recipients" may be individuals or organizations.

To "modify" a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a "modified version" of the earlier work or a work "based on" the earlier work.

A "covered work" means either the unmodified Program or a work based on the Program.

To "propagate" a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To "convey" a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays "Appropriate Legal Notices" to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

1. Source Code.

The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

A "Standard Interface" means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

The "System Libraries" of an executable work include anything, other than the work as a whole, that (a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and (b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A "Major Component", in this context, means a major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

The "Corresponding Source" for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work's System Libraries, or general-purpose tools or generally available free programs which are used unmodified in performing those activities but which are not part of the work. For example, Corresponding Source includes interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require, such as by intimate data communication or control flow between those subprograms and other parts of the work.

The Corresponding Source need not include anything that users can regenerate automatically from other parts of the Corresponding Source.

The Corresponding Source for a work in source code form is that same work.

2. Basic Permissions.

All rights granted under this License are granted for the term of copyright on the Program, and are irrevocable provided the stated conditions are met. This License explicitly affirms your unlimited permission to run the unmodified Program. The output from running a covered work is covered by this License only if the output, given its content, constitutes a covered work. This License acknowledges your rights of fair use or other equivalent, as provided by copyright law.

You may make, run and propagate covered works that you do not convey, without conditions so long as your license otherwise remains in force. You may convey covered works to others for the sole purpose of having them make modifications exclusively for you, or provide you with facilities for running those works, provided that you comply with the terms of this License in conveying all material for which you do not control copyright. Those thus making or running the covered works for you must do so exclusively on your behalf, under your direction and control, on terms that prohibit them from making any copies of your copyrighted material outside their relationship with you.

Conveying under any other circumstances is permitted solely under the conditions stated below. Sublicensing is not allowed; section 10 makes it unnecessary.

3. Protecting Users' Legal Rights From Anti-Circumvention Law.

No covered work shall be deemed part of an effective technological measure under any applicable law fulfilling obligations under article 11 of the WIPO copyright treaty adopted on 20 December 1996, or similar laws prohibiting or restricting circumvention of such measures.

When you convey a covered work, you waive any legal power to forbid circumvention of technological measures to the extent such circumvention is effected by exercising rights under this License with respect to the covered work, and you disclaim any intention to limit operation or modification of the work as a means of enforcing, against the work's users, your or third parties' legal rights to forbid circumvention of technological measures.

4. Conveying Verbatim Copies.

You may convey verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice; keep intact all notices stating that this License and any non-permissive terms added in accord with section 7 apply to the code; keep intact all notices of the absence of any warranty; and give all recipients a copy of this License along with the Program.

You may charge any price or no price for each copy that you convey, and you may offer support or warranty protection for a fee.

5. Conveying Modified Source Versions.

You may convey a work based on the Program, or the modifications to produce it from the Program, in the form of source code under the terms of section 4, provided that you also meet all of these conditions:

a) The work must carry prominent notices stating that you modified it, and giving a relevant date.

b) The work must carry prominent notices stating that it is released under this License and any conditions added under section 7. This requirement modifies the requirement in section 4 to "keep intact all notices".

c) You must license the entire work, as a whole, under this License to anyone who comes into possession of a copy. This License will therefore apply, along with any applicable section 7 additional terms, to the whole of the work, and all its parts, regardless of how they are packaged. This License gives no permission to license the work in any other way, but it does not invalidate such permission if you have separately received it.

d) If the work has interactive user interfaces, each must display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.

A compilation of a covered work with other separate and independent works, which are not by their nature extensions of the covered work, and which are not combined with it such as to form a larger program, in or on a volume of a storage or distribution medium, is called an "aggregate" if the compilation and its resulting copyright are not used to limit the access or legal rights of the compilation's users beyond what the individual works permit. Inclusion of a covered work in an aggregate does not cause this License to apply to the other parts of the aggregate.

6. Conveying Non-Source Forms.

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

a) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.

b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.

c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.

d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.

e) Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.

A "User Product" is either (1) a "consumer product", which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product, doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, "normally used" refers to a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has substantial commercial, industrial or non-consumer uses, unless such uses represent the only significant mode of use of the product.

"Installation Information" for a User Product means any methods, procedures, authorization keys, or other information required to install and execute modified versions of a covered work in that User Product from a modified version of its Corresponding Source. The information must suffice to ensure that the continued functioning of the modified object code is in no case prevented or interfered with solely because modification has been made.

If you convey an object code work under this section in, or with, or specifically for use in, a User Product, and the conveying occurs as part of a transaction in which the right of possession and use of the User Product is transferred to the recipient in perpetuity or for a fixed term (regardless of how the transaction is characterized),

the Corresponding Source conveyed under this section must be accompanied by the Installation Information. But this requirement does not apply if neither you nor any third party retains the ability to install modified object code on the User Product (for example, the work has been installed in ROM).

The requirement to provide Installation Information does not include a requirement to continue to provide support service, warranty, or updates for a work that has been modified or installed by the recipient, or for the User Product in which it has been modified or installed. Access to a network may be denied when the modification itself materially and adversely affects the operation of the network or violates the rules and protocols for communication across the network.

Corresponding Source conveyed, and Installation Information provided, in accord with this section must be in a format that is publicly documented (and with an implementation available to the public in source code form), and must require no special password or key for unpacking, reading or copying.

7. Additional Terms.

"Additional permissions" are terms that supplement the terms of this License by making exceptions from one or more of its conditions. Additional permissions that are applicable to the entire Program shall be treated as though they were included in this License, to the extent that they are valid under applicable law. If additional permissions apply only to part of the Program, that part may be used separately under those permissions, but the entire Program remains governed by this License without regard to the additional permissions.

When you convey a copy of a covered work, you may at your option remove any additional permissions from that copy, or from any part of it. (Additional permissions may be written to require their own removal in certain cases when you modify the work.) You may place additional permissions on material, added by you to a covered work, for which you have or can give appropriate copyright permission.

Notwithstanding any other provision of this License, for material you add to a covered work, you may (if authorized by the copyright holders of that material) supplement the terms of this License with terms:

a) Disclaiming warranty or limiting liability differently from the terms of sections 15 and 16 of this License; or

b) Requiring preservation of specified reasonable legal notices or author attributions in that material or in the Appropriate Legal Notices displayed by works containing it; or

c) Prohibiting misrepresentation of the origin of that material, or requiring that modified versions of such material be marked in reasonable ways as different from the original version; or

d) Limiting the use for publicity purposes of names of licensors or authors of the material; or

e) Declining to grant rights under trademark law for use of some trade names, trademarks, or service marks; or

f) Requiring indemnification of licensors and authors of that material by anyone who conveys the material (or modified versions of it) with contractual assumptions of liability to the recipient, for any liability that these contractual assumptions directly impose on those licensors and authors.

All other non-permissive additional terms are considered "further restrictions" within the meaning of section 10. If the Program as you received it, or any part of it, contains a notice stating that it is governed by this License along with a term that is a further restriction, you may remove that term. If a license document contains a further restriction but permits relicensing or conveying under this License, you may add to a covered work material governed by the terms of that license document, provided that the further restriction does not survive such relicensing or conveying.

If you add terms to a covered work in accord with this section, you must place, in the relevant source files, a statement of the additional terms that apply to those files, or a notice indicating where to find the applicable terms.

Additional terms, permissive or non-permissive, may be stated in the form of a separately written license, or stated as exceptions; the above requirements apply either way.

8. Termination.

You may not propagate or modify a covered work except as expressly provided under this License. Any attempt otherwise to propagate or modify it is void, and will automatically terminate your rights under this License (including any patent licenses granted under the third paragraph of section 11).

However, if you cease all violation of this License, then your license from a particular copyright holder is reinstated (a) provisionally, unless and until the copyright holder explicitly and finally terminates your license, and (b) permanently, if the copyright holder fails to notify you of the violation by some reasonable means prior to 60 days after the cessation.

Moreover, your license from a particular copyright holder is reinstated permanently if the copyright holder notifies you of the violation by some reasonable means, this is the first time you have received notice of violation of this License (for any work) from that copyright holder, and you cure the violation prior to 30 days after your receipt of the notice.

Termination of your rights under this section does not terminate the licenses of parties who have received copies or rights from you under this License. If your rights have been terminated and not permanently reinstated, you do not qualify to receive new licenses for the same material under section 10.

9. Acceptance Not Required for Having Copies.

You are not required to accept this License in order to receive or run a copy of the Program. Ancillary propagation of a covered work occurring solely as a consequence of using peer-to-peer transmission to receive a copy likewise does not require acceptance. However, nothing other than this License grants you permission to propagate or modify any covered work. These actions infringe copyright if you do not accept this License. Therefore, by modifying or propagating a covered work, you indicate your acceptance of this License to do so.

10. Automatic Licensing of Downstream Recipients.

Each time you convey a covered work, the recipient automatically receives a license from the original licensors, to run, modify and propagate that work, subject to this License. You are not responsible for enforcing compliance by third parties with this License.

An "entity transaction" is a transaction transferring control of an organization, or substantially all assets of one, or subdividing an organization, or merging organizations. If propagation of a covered work results from an entity transaction, each party to that transaction who receives a copy of the work also receives whatever licenses to the work the party's predecessor in interest had or could give under the previous paragraph, plus a right to possession of the Corresponding Source of the work from the predecessor in interest, if the predecessor has it or can get it with reasonable efforts.

You may not impose any further restrictions on the exercise of the rights granted or affirmed under this License. For example, you may not impose a license fee, royalty, or other charge for exercise of rights granted under this License, and you may not initiate litigation (including a cross-claim or counterclaim in a lawsuit) alleging that any patent claim is infringed by making, using, selling, offering for sale, or importing the Program or any portion of it.

11. Patents.

A "contributor" is a copyright holder who authorizes use under this License of the Program or a work on which the Program is based. The work thus licensed is called the contributor's "contributor version".

A contributor's "essential patent claims" are all patent claims owned or controlled by the contributor, whether already acquired or hereafter acquired, that would be infringed by some manner, permitted by this License, of making, using, or selling its contributor version, but do not include claims that would be infringed only as a consequence of further modification of the contributor version. For purposes of this definition, "control" includes the right to grant patent sublicenses in a manner consistent with the requirements of this License.

Each contributor grants you a non-exclusive, worldwide, royalty-free patent license under the contributor's essential patent claims, to make, use, sell, offer for sale, import and otherwise run, modify and propagate the contents of its contributor version.

In the following three paragraphs, a "patent license" is any express agreement or commitment, however denominated, not to enforce a patent (such as an express permission to practice a patent or covenant not to sue for patent infringement). To "grant" such a patent license to a party means to make such an agreement or commitment not to enforce a patent against the party.

If you convey a covered work, knowingly relying on a patent license, and the Corresponding Source of the work is not available for anyone to copy, free of charge and under the terms of this License, through a publicly available network server or other readily accessible means, then you must either (1) cause the Corresponding Source to be so available, or (2) arrange to deprive yourself of the benefit of the patent license for this particular work, or (3) arrange, in a manner consistent with the requirements of this License, to extend the patent license to downstream recipients. "Knowingly relying" means you have actual knowledge that, but for the patent license, your conveying the covered work in a country, or your recipient's use of the covered work in a country, would infringe one or more identifiable patents in that country that you have reason to believe are valid.

If, pursuant to or in connection with a single transaction or arrangement, you convey, or propagate by procuring conveyance of, a covered work, and grant a patent license to some of the parties receiving the covered work authorizing them to use, propagate, modify or convey a specific copy of the covered work, then the patent license you grant is automatically extended to all recipients of the covered work and works based on it.

A patent license is "discriminatory" if it does not include within the scope of its coverage, prohibits the exercise of, or is conditioned on the non-exercise of one or more of the rights that are specifically granted under this License. You may not convey a covered work if you are a party to an arrangement with a third party that is in the business of distributing software, under which you make payment to the third party based on the extent of your activity of conveying the work, and under which the third party grants, to any of the parties who would receive the covered work from you, a discriminatory patent license (a) in connection with copies of the covered work conveyed by you (or copies made from those copies), or (b) primarily for and in connection with specific products or compilations that contain the covered work, unless you entered into that arrangement, or that patent license was granted, prior to 28 March 2007.

Nothing in this License shall be construed as excluding or limiting any implied license or other defenses to infringement that may otherwise be available to you under applicable patent law.

12. No Surrender of Others' Freedom.

If conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot convey a covered work so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not convey it at all. For example, if you agree to terms that obligate you to collect a royalty for further conveying from those to whom you convey the Program, the only way you could satisfy both those terms and this License would be to refrain entirely from conveying the Program.

13. Use with the GNU Affero General Public License.

Notwithstanding any other provision of this License, you have permission to link or combine any covered work with a work licensed under version 3 of the GNU Affero General Public License into a single combined work, and to convey the resulting work. The terms of this License will continue to apply to the part which is the covered work, but the special requirements of the GNU Affero General Public License, section 13, concerning interaction through a network will apply to the combination as such.

14. Revised Versions of this License.

The Free Software Foundation may publish revised and/or new versions of the GNU General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies that a certain numbered version of the GNU General Public License "or any later version" applies to it, you have the option of following the terms and conditions either of that numbered version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of the GNU General Public License, you may choose any version ever published by the Free Software Foundation.

If the Program specifies that a proxy can decide which future versions of the GNU General Public License can be used, that proxy's public statement of acceptance of a version permanently authorizes you to choose that version for the Program.

Later license versions may give you additional or different permissions. However, no additional obligations are imposed on any author or copyright holder as a result of your choosing to follow a later version.

15. Disclaimer of Warranty.

THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. Limitation of Liability.

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MODIFIES AND/OR CONVEYS THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

17. Interpretation of Sections 15 and 16.

If the disclaimer of warranty and limitation of liability provided above cannot be given local legal effect according to their terms, reviewing courts shall apply local law that most closely approximates an absolute waiver of all civil liability in connection with the Program, unless a warranty or assumption of liability accompanies a copy of the Program in return for a fee.

IJG

The authors make NO WARRANTY or representation, either express or implied, with respect to this software, its quality, accuracy, merchantability, or fitness for a particular purpose. This software is provided "AS IS", and you, its user, assume the entire risk as to its quality and accuracy.

This software is copyright (C) 1991-1998, Thomas G. Lane.

All Rights Reserved except as specified below.

Permission is hereby granted to use, copy, modify, and distribute this software (or portions thereof) for any purpose, without fee, subject to these conditions:

(1) If any part of the source code for this software is distributed, then this README file must be included, with this copyright and no-warranty notice unaltered; and any additions, deletions, or changes to the original files must be clearly indicated in accompanying documentation.

(2) If only executable code is distributed, then the accompanying documentation must state that "this software is based in part on the work of the Independent JPEG Group".

(3) Permission for use of this software is granted only if the user accepts full responsibility for any undesirable consequences; the authors accept NO LIABILITY for damages of any kind.

LGPL

GNU LESSER GENERAL PUBLIC LICENSE
Version 3, 29 June 2007
Copyright (C) 2007 Free Software Foundation, Inc. <http://fsf.org/>

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

This version of the GNU Lesser General Public License incorporates the terms and conditions of version 3 of the GNU General Public License, supplemented by the additional permissions listed below.

0. Additional Definitions.
As used herein, "this License" refers to version 3 of the GNU Lesser General Public License, and the "GNU GPL" refers to version 3 of the GNU General Public License.

"The Library" refers to a covered work governed by this License, other than an Application or a Combined Work as defined below.

An "Application" is any work that makes use of an interface provided by the Library, but which is not otherwise based on the Library. Defining a subclass of a class defined by the Library is deemed a mode of using an interface provided by the Library.

A "Combined Work" is a work produced by combining or linking an Application with the Library. The particular version of the Library with which the Combined

Work was made is also called the "Linked Version".

The "Minimal Corresponding Source" for a Combined Work means the Corresponding Source for the Combined Work, excluding any source code for portions of the

Combined Work that, considered in isolation, are based on the Application, and not on the Linked Version.

The "Corresponding Application Code" for a Combined Work means the object code and/or source code for the Application, including any data and utility programs needed for reproducing the Combined Work from the Application, but excluding the System Libraries of the Combined Work.

1. Exception to Section 3 of the GNU GPL.
You may convey a covered work under sections 3 and 4 of this License without being bound by section 3 of the GNU GPL.

2. Conveying Modified Versions.
If you modify a copy of the Library, and, in your modifications, a facility refers to a function or data to be supplied by an Application that uses the facility (other than as an argument passed when the facility is invoked), then you may convey a copy of the modified version:

a) under this License, provided that you make a good faith effort to ensure that, in the event an Application does not supply the function or data, the facility still operates, and performs whatever part of its purpose remains meaningful, or

b) under the GNU GPL, with none of the additional permissions of this License applicable to that copy.

3. Object Code Incorporating Material from Library Header Files.
The object code form of an Application may incorporate material from a header file that is part of the Library. You may convey such object code under terms of your choice, provided that, if the incorporated material is not limited to numerical parameters, data structure layouts and accessors, or small macros, inline functions and templates (ten or fewer lines in length), you do both of the following:

a) Give prominent notice with each copy of the object code that the Library is used in it and that the Library and its use are covered by this License.

b) Accompany the object code with a copy of the GNU GPL and this license document.

4. Combined Works.
You may convey a Combined Work under terms of your choice that, taken together, effectively do not restrict modification of the portions of the Library contained in the Combined Work and reverse engineering for debugging such modifications, if you also do each of the following:

a) Give prominent notice with each copy of the Combined Work that the Library is used in it and that the Library and its use are covered by this License.

b) Accompany the Combined Work with a copy of the GNU GPL and this license document.

c) For a Combined Work that displays copyright notices during execution, include the copyright notice for the Library among these notices, as well as a reference directing the user to the copies of the GNU GPL and this license document.

d) Do one of the following:

1) Convey the Minimal Corresponding Source under the terms of this License, and the Corresponding Application Code in a form suitable for, and under terms that permit, the user to recombine or relink the Application with a modified version of the Linked Version to produce a modified Combined Work, in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source.

2) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (a) uses at run time a copy of the Library already present on the user's computer system, and (b) will operate properly with a modified version of the Library that is interface-compatible with the Linked Version.

e) Provide Installation Information, but only if you would otherwise be required to provide such information under section 6 of the GNU GPL, and only to the extent that such information is necessary to install and execute a modified version of the Combined Work produced by recombining or relinking the Application with a modified version of the Linked Version. (If you use option 4d0, the Installation Information must accompany the Minimal Corresponding Source and Corresponding Application Code. If you use option 4d1, you must provide the Installation Information in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source.)

5. Combined Libraries.
You may place library facilities that are a work based on the Library side by side in a single library together with other library facilities that are not Applications and are not covered by this License, and convey such a combined library under terms of your choice, if you do both of the following:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities, conveyed under the terms of this License.

b) Give prominent notice with the combined library that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

6. Revised Versions of the GNU Lesser General Public License.

The Free Software Foundation may publish revised and/or new versions of the GNU Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library as you received it specifies that a certain numbered version of the GNU Lesser General Public License "or any later version" applies to it, you have the option of following the terms and conditions either of that published version or of any later version published by the Free Software Foundation. If the Library as you received it does not specify a version number of the GNU Lesser General Public License, you may choose any version of the GNU Lesser General Public License ever published by the Free Software Foundation.

If the Library as you received it specifies that a proxy can decide whether future versions of the GNU Lesser General Public License shall apply, that proxy's public statement of acceptance of any version is permanent authorization for you to choose that version for the Library.

MIT

Copyright 1987, 1988 by MIT Student Information Processing Board.

Permission to use, copy, modify, and distribute this software and its documentation for any purpose is hereby granted, provided that the names of M.I.T. and the M.I.T. S.I.P.B. not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. M.I.T. and the M.I.T. S.I.P.B. make no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

zlib

Copyright (C) 1995-1998 Jean-loup Gailly and Mark Adler

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.

2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.

3. This notice may not be removed or altered from any source distribution.Jean-loup Gailly Mark Adler jloup@gzip.org madler@alumni.caltech.edu

The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files ftp://ds.internic.net/rfc/rfc1950.txt (zlib format), rfc1951.txt (deflate format) and rfc1952.txt (gzip format).

Appendix E. Service Information

In This Appendix

This appendix contains the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this openGear product is not required. In the event of problems with your MC1-MK, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Technical Support department at the numbers listed under the "**Contact Us**" section.

1. **Visual Review** — Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the card, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check —** Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Reference Signal Status** — Verify that the analog reference (blackburst or tri-level) is supplied on one of the three reference inputs. Check the Reference Input and the Output Format settings. Also check the status of the reference by navigating to the Reference Status field located on the Signal tab in DashBoard.
4. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
5. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
6. **Unit Exchange** — Exchanging a suspect unit with a unit that is known to be working correctly is an efficient method for localizing problems to individual units.

Software Upgrades

If you encounter problems when upgrading your card software, verify the following:

- Your network settings on the card are valid. Refer to **Table 8.11** on page 8-15 for a list of settings.
- Ethernet communication is properly configured.
- The file you are attempting to load is a ***.bin** file that is for the card you are upgrading.

Warranty and Repair Policy

The MC1-MK is warranted to be free of any defect with respect to performance, quality, reliability, and workmanship for a period of FIVE (5) years from the date of shipment from our factory. In the event that your MC1-MK proves to be defective in any way during this warranty period, Ross Video Limited reserves the right to repair or replace this piece of equipment with a unit of equal or superior performance characteristics.

Should you find that this MC1-MK has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits) incurred by the use of this product. Implied warranties are expressly limited to the duration of this warranty.

This User Manual provides all pertinent information for the safe installation and operation of your openGear Product. Ross Video policy dictates that all repairs to the MC1-MK are to be conducted only by an authorized Ross Video Limited factory representative. Therefore, any unauthorized attempt to repair this product, by anyone other than an authorized Ross Video Limited factory representative, will automatically void the warranty. Please contact Ross Video Technical Support for more information.

In Case of Problems

Should any problem arise with your MC1-MK, please contact the Ross Video Technical Support Department. (Contact information is supplied at the end of this publication.)

A Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions, should you wish our factory to repair your MC1-MK. If required, a temporary replacement frame will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

The Ross Video Technical Support Department will continue to provide advice on any product manufactured by Ross Video Limited, beyond the warranty period without charge, for the life of the equipment.

Index

A

Alarm
- audio 8-3
- BKGD A 8-6
- BKGD B 8-6
- CompactFlash card 8-4
- EAS Text Attributes 8-27, 8-29
- hardware status 8-3
- Key Alpha 8-6
- Key Video 8-6
- memory usage 8-4
- power consumption 8-3
- reference signal 8-2
- signal loss 4-3, 8-6
- stalled fan 8-18
- timing 8-2
- video signal 8-2

Apply Changes button 8-15

Audio
- alarms 8-3
- channel map 5-5
- channel mapping 5-8, 5-9
- duck level, EAS 8-7
- EAS 5-9, 5-10
- embedded groups, enabling 5-4, 8-7
- gain 5-7
- gain level, transitions 5-11
- gain, EAS 8-7
- groups, embedding 5-1
- input status 8-3
- invert 5-7
- processing 5-7, 8-24
- profiles, creating 5-12, 8-24
- shuffle 8-23
- synchronous 8-3
- voice over 5-8, 8-23

Audio Over Selection tab 5-8, 5-9, 8-23

Audio Shuffle tab 8-23

Audio tab 5-4, 8-7

B

Baud Rate, selecting 2-17

Bit Rate, selecting 8-11

BKGD A
- audio status 8-3
- equalization, specification 9-2
- Signal Loss alarm 8-6
- status 8-2
- timing status 8-2

BKGD B
- audio status 8-3
- Signal Loss alarm 8-6
- status 8-2
- timing status 8-3

Buses, swapping 4-7

Bypass mode 2-5

C

Cabling
- ethernet 2-12
- GPI 2-14
- inputs 2-9, 7-4
- LTC 2-16
- outputs 2-10
- reference 2-11
- serial 2-16
- serial, specification 9-2
- tallies 2-14

Card-edge LEDs 2-4

CF Card Status field 8-4

Channel map, audio 5-5, 8-23

Channel Select buttons 4-11, 4-12, 4-13, 4-14

Channels
- mapping, audio 5-8, 5-9
- multiple 4-11, 4-13

Checklist, troubleshooting 12-2

Clip at Black, applying 4-3, 8-5

Clip at White, applying 4-3, 8-5

Communication, ethernet 2-13

CompactFlash
- graphic files 4-11
- status field 8-4

Components, overview 2-3

Configuration interface 2-7

Configuration Menus
- output setup 8-5
- overview 8-5
- reference setup 8-5

Configuring
- outputs 4-2, 4-3
- transition buttons 4-6
- video, notes on 9-6

Consumption, power 9-2

CPU Usage field 8-4

Crosspoints
- mapping 3-7, 7-5
- RTR Extra buttons 3-7

Current consumption field 8-3

D

DashBoard
- audio status field 8-3
- CF Card Status field 8-4

Clip at Black 4-3, 8-5
Clip at White 4-3, 8-5
Configuration interface 2-7
configuration menus 8-5
CPU Usage field 8-4
Current consumption field 8-3
Dithering, configuring 4-3, 8-5
Ethernet Status field 8-15
FPGA Core Temperature field 8-3
GPI/Tally tab 8-8, 8-9
hardware information 8-3
input signal loss alarm 8-6
input status fields 8-2
NTSC Pass Line 4-3
NTSC Pass Line 21 8-6
Output Format setup 8-5
Output Setup options 8-5
Output Timing field 8-3
overview 1-5
Personality tab 4-6
Playout RAM field 8-4
Power consumption field 8-3
product information 8-4
RAM Available field 8-4
Rear Module field 8-4
Reference Format field 8-2
Reference Setup options 8-5
Reference Status field 8-2
Remote Control tab 8-10
selecting reference input 8-5
Serial Number field 8-4
signal information 8-2
Signal Loss Alarm, setup 8-6
software upgrades 4-15
status 8-2
Video tab 4-2, 4-3
Voltage field 8-3
Dashboard, launching 2-6
Data Bits, selecting 2-17, 8-11
DC Offset, specification 9-2
Default Gateway 8-15
Device control 2-19
DHCP 2-13, 8-15
Disarm Preset Keyers 4-8
Dithering, configuring 4-3, 8-5
Documentation terms 1-7

E

EAS
alarm 8-29
audio level, setting 5-10
audio, setup 8-23
text overlay 6-2, 8-26, 8-28
EAS Duck Level 5-10, 8-7
EAS, setup 5-9
Edge, GPI 8-8, 9-5
Edit permissions 4-6
Effects, SqueezeBack 4-4
Embedded audio 5-1, 8-7
Embedded Audio Selection tab 5-8, 5-9
Emulation commands 10-1
ESD Susceptibility 2-2
Ethernet
Apply Changes button 8-15
communication, setup 2-12, 8-15
connections 2-12
Default Gateway, selecting a 8-15
DHCP option 2-13
IP Address, selecting a 8-15
MAC Address, selecting a 8-15
static option 2-13
status field 8-15
Subnet Mask Address, selecting a 8-15

F

Factory defaults, loading 8-21
Fan alarm, enabling 8-18
Features, product 1-2
Files, Channel Select button graphic 4-11
Format
output 8-5
video 4-2
FPGA Core Temperature field 8-3
Frames, installing the card in 2-6
Function, tally 8-9

G

Gain, audio 5-7, 5-11, 8-7
Gateway 2-13
Global Settings 8-21
GPI
cabling 2-14
configuration 2-15, 4-5
edge 8-8
high/rising 8-9
level 8-8
low/falling 8-9
LTC 2-17
polarity 8-9
setup options 8-8
trigger 8-8, 9-5
GPI Auto Key 8-8
GPI Cut Key 8-8
GPI EAS Audio Over 8-8
GPI Fade to Black 8-8
GPI SqueezeBack Effect 8-8
GPI Take 8-8
GPI Voice Over 8-8
GPI/Tally Setup tab 8-8
GPI/Tally tab 2-15
Groups, audio 5-4, 8-3

H

Hardware information, read-only 8-3
High/Rising, GPI 8-9, 9-5

I

I/O Modules, types used 2-8
Icons, Channel Select buttons 4-11
Impedance
- input, specification 9-2
- output, specification 9-2

Inputs
- cabling 2-9, 7-4
- configuration notes 9-6
- mapping 2-9
- reference 8-5
- return loss, specification 9-2
- specifications 9-2
- status LEDs 2-4
- timing 9-6
- timing, status 4-6

Installing, rear module 2-5
Inverting, audio 5-7
IP Address 2-13, 8-15

J

J7, Reference termination 2-3, 8-5
JPEG format 1-2
Jumpers 2-3

K

Key Alpha
- alarm, enabling 8-6
- Signal status 8-2
- status 8-2
- timing status 8-3

Key order, SqueezeBack effects 4-4
Key Video
- alarm, enabling 8-6
- status field 8-2
- timing status 8-3

L

LEDs
- input status 2-4
- overview 2-4
- reference status 2-4

Level, GPI 8-8
Linear Timecode, see LTC
Load Factory Defaults 4-7, 8-21
Load/Save tab 4-7, 8-21
Loss, power 2-5
Low/Falling, GPI 8-9
LTC
- cable connections 2-16
- cabling 2-16
- serial communication setup 8-11
- serial, using 2-16
- using GPIs 2-17

M

MAC Address 2-13, 8-15
Mapping
- crosspoints 3-7, 7-5
- outputs 2-9, 2-10, 3-6
- overview 3-6, 7-5
- RTR Extra buttons 3-7

MC1-MK-4GB 1-2, 1-7, 2-3
Menu
- GPI/Tally Setup 8-8
- Output Setup 8-5
- overview 1-5
- parameters, resetting 4-7
- Tally Setup 8-9

Miranda Presmaster protocol 1-5, 10-1
Module, Rear I/O 2-5
Multiple channels 4-11, 4-13

N

Network
- cabling 2-12
- communication, setup 2-12

NTSC Pass Line 21 ..... 4-3, 8-6

O

Output Setup options 8-5
Output, audio 8-7
Outputs
- cabling 2-10
- Clip at Black feature 4-3
- Clip at White feature 4-3
- configuration notes 9-6
- configuring 4-3
- dithering, applying 4-3
- impedance, specification 9-2
- mapping 2-10, 3-6
- NTSC Pass Line 21 feature 4-3
- reference format, compatibility 9-6
- reference, selecting 8-5
- return loss, specification 9-2
- specifications 9-2
- timing status 8-3

Overlay, text 6-2, 6-3
Overshoot, specification 9-2
Overview
- components 2-3
- Configuration Menus 8-5
- DashBoard interface 1-5
- LEDs 2-4
- Miranda Presmaster protocol 1-5
- Status Menus 8-2
- Tally setup 9-5

P

Parameters
- EAS text overlay 8-26, 8-28
- ethernet setup 8-15
- GPI setup 8-8
- outputs 8-5
- Reference 8-5
- router setup 8-22, 8-25
- serial setup 8-10
- signal loss alarms 8-6
- tally setup 8-9
- timing 8-16
- transitions 8-16

Parity, selecting 2-17, 8-11
Permission, edit 4-6
Personality tab 4-6, 8-18
Pinouts
- LTC 9-4
- serial 9-4

Playout RAM field 8-4
PNG format 1-2
Polarity 2-15, 4-5
- GPI 8-9
- high/rising 8-9
- low/falling 8-9
- tally 8-9

Policy, warranty and repair 12-3
Port Enabled option 8-10
Port Type, selecting 2-17, 8-10
Power
- consumption 9-2
- fail relay 2-5
- loss 2-5
- status 8-3

Proc Amps, audio 5-7, 8-24
Product information, read-only 8-4
Profiles, audio 5-12, 8-24
Program bus, transitions 4-7
Protocol
- Miranda Presmaster 1-5, 10-1
- serial 8-11, 10-1

R

RAM Available field 8-4
Read-only information
- hardware 8-3
- product 8-4
- signal 8-2

Rear modules
- bypass relay 2-5
- installing 2-5
- status 8-4
- types used 2-8

REF STAT LED 2-4
Reference
- cabling 2-11
- compatibility 9-6
- format, status 8-2
- input selection 8-5
- JP7, setting 2-3
- options 8-5
- output format, selecting 8-5
- source, selecting a 4-2
- termination jumper 2-3

Reference Format field 8-2
Reference Status field 8-2
Relay, power fail 2-5
Remote control
- baud rate, selecting 2-17
- communication type, selecting 2-17
- data bits, selecting 2-17
- parity, selecting 2-17
- setup options 8-10
- stop bits, selecting 2-17

Remote Control tab 8-10
Repair and warranty policy 12-3
Reset
- button, on card 2-3
- menu parameters 4-7

Return loss, specification 9-2
Rise and fall time, specification 9-2
Router
- communication setup 3-4
- crosspoint mapping 3-7, 7-5
- mapping, source 3-6
- RTR Extra buttons 3-7

RS-232 communication 2-17
RS-422 communication 2-17
RTR Extra buttons 3-7

S

Selecting
- GPI trigger 2-15
- output video format 4-2
- polarity, tally 2-15, 4-5
- port type 2-17
- reference 8-5

Serial
- Bit Rate 8-11
- communication setup 3-4, 8-10
- Data Bits 8-11
- inputs, specifications 9-2
- outputs, specifications 9-2
- Parity 8-11
- Port Enabled option 8-10
- Port Type option 8-10
- port, pin assignment 9-3, 9-4
- Protocol option 8-11
- Stop Bits 8-11

Serial COM port 2-16
Serial number field 8-4
Serial protocols
- communication setup 8-11

emulation commands 10-1
selecting a 8-11
Setup
card, installing 2-6
channel select buttons 4-12, 4-14
Configuration interface, accessing 2-7
crosspoint mapping 3-7, 7-5
DashBoard, launching 2-6
EAS Duck level 5-10
embedded audio groups 5-4
ethernet cabling 2-12
external devices, communications to 2-19
GPIs 2-14
icons, channel select buttons 4-11
input cabling 2-9, 7-4
input mapping 2-9
input signal timing alarms 4-6
keyers, transitions 4-8
LTC cabling 2-16
network communications 2-12
output cabling 2-10
output mapping 2-10, 3-6, 7-5
permissions 4-6
power fail relay 2-5
rear module, installing 2-5
reference cabling 2-11
reference source, selecting 4-2
router, communication 3-4
RTR Extra buttons 3-7
signal loss alarm 4-3
tallies 2-14
text overlay, EAS 6-2
video format, selecting 4-2
video outputs, configuring 4-3
Shuffle, audio 8-23
Shuffling, audio 5-5
Signal
information, read-only 8-2
level, specification 9-2
loss alarm, enabling 4-3
loss alarm, setup 8-6
status 8-2
timing 4-6, 8-3, 9-6
SMPTE standards 9-2
Software upgrades 4-15
Specifications
overview 9-2
serial digital video inputs 9-2
serial digital video outputs 9-2
SMPTE standards 9-2
SqueezeBack effect
setup 8-17
SqueezeBack effects
key order, specifying 4-4
SqueezeBack tab 4-4, 8-17
Static discharge 2-2
Static, ethernet setup 2-13, 8-15
Station logos 4-11
Status
signal loss alarm 4-3
tabs, overview 8-2
Stop Bits, selecting 2-17, 8-11
Subnet Mask Address 2-13, 8-15

T

Tab
EAS Setup 8-26, 8-28
Ethernet 8-15
GPI/Tally Setup 8-8
Hardware 8-3
Load/Save 8-21
Personality 8-16
Product 8-4
Router 8-22, 8-25
Serial 8-10
Signal 8-2, 8-3
Status 8-2
Video 8-5
Tally
cabling 2-14
configuration 2-15, 4-5
function 8-9
overview 9-5
polarity 8-9
setup options 8-9
Terms, documentation 1-7
Text overlay, EAS 6-2, 6-3, 8-26, 8-28
TGA format 1-2
Timecode input, GPI 8-8
Timing
display, configuring 4-6, 8-18
outputs, status 8-3
reference 9-6
SDI outputs 9-6
signal status 8-3
status 8-2
Timing Display field 4-6, 8-2, 8-18
Transitions
audio gain level, resetting 5-11
buses, swapping 4-7
keyers 4-8
Trigger 2-15
edge 8-8
GPIs 8-8
level 8-8
Troubleshooting 12-2

U

Upgrades, software 4-15

V

Video
cabling 2-9, 2-10, 7-4

configuration menus 8-5
format, selecting a 4-2
inputs, specifications 9-2
outputs, specifications 9-2
Voice over, setup 5-8, 8-23
Voltage status field 8-3

W

Warranty and repair policy 12-3

Notes:

Contact Us

Contact our friendly and professional support representatives for the following:

- Name and address of your local dealer
- Product information and pricing
- Technical support
- Upcoming trade show information

Technical Support	Telephone:	+1 613 • 652 • 4886
	After Hours Emergency:	+1 613 • 349 • 0006
	Email:	techsupport@rossvideo.com
General Information	Telephone:	+1 613 • 652 • 4886
	Fax:	+1 613 • 652 • 4425
	Email:	solutions@rossvideo.com
	Website:	http://www.rossvideo.com

Visit Us

Visit our website for:

- Company information and news
- Related products and full product lines
- Online catalog
- Testimonials